GAS JOURNAL, MARCH 1, 1939

VOL. 225. 91st YEAR. No. 3954.

Editorial Notes

The Cannock Coal Prices Enquiry

In our last issue time only availed to set out the findings of the North Staffordshire Committee of Investigation in the complaint of Gas Consolidation, Ltd., on behalf of itself and its subsidiary, the Cannock District Gas Company, Ltd. An account of the hearing was published in our issue of Feb. 1, to which reference will no doubt be made in considering the precise effect of the findings of the Committee. The decision of the Committee is a signal victory for Gas Consolidation, Ltd., and congratulations are due to them upon an achievement which is of great importance not only to the Gas Industry, but to industrial consumers of coal throughout the country.

The case for Gas Consolidation, Ltd., was a strong one, and indicates the extent to which the Coal Selling Committees are prepared to utilize the powers of their monopoly. As one of the coal witnesses is reported to have stated in evidence, the object of the Act is not to protect the interests of gas undertakings or to compel owners to sell at a lower price, but to protect the interests of the coal industry. This statement, the truth of which would hardly be denied, has evidently been accepted all too literally by Coal Selling Organizations. In the case now under review, it appears that in the opinion of the Sales Committee an original price of 18s. 1d., subsequently reduced to 16s. 1d., to the Cannock Gas Company, was "in the interests of the coal industry," although a neighbouring gas company was entitled, presumably in the same interests, to receive precisely similar coal at 14s. 9d. Further, while those responsible for the administration of the Cannock Gas Company and for the performance of that Company's duties to the public considered that their requirements demanded a specified quantity of coal, the Sales Committee, in presumably the superior interests of the coal industry, reduced that quantity by 25%.

The complaint of Gas Consolidation, Ltd., and the Cannock Gas Company is the third complaint which gas undertakers have made to Committees of Investigation since the new procedure of the Coal Mines Act, 1938, came into force. The other complaints were those of the Stretford and District Gas Board and the Newcastle-upon-Tyne and Gateshead Gas Company, in both of which the contentions of the gas undertaking were rejected by the respective Committees of Investigation. The labour and expense involved in these enquiries will not, however, have been in vain if they have the effect of bringing forcibly before the public the arbitrary and high-handed policy adopted by the Coal Selling Organizations.

In the Stretford case certain coal was preferred by the Gas Board as being particularly suitable for their carbonization plant. It was naturally willing to offer a higher price for that coal than for coal which was less suitable. Notwithstanding this reasonable preference, however, the Gas Board is forced to accept, at a price not differing from the coal which was demanded, coal which it considers less suitable for its purpose. The District Coal Board's justification was that they considered the quality of the two coals to be equal. Therefore, as in the Cannock case the Sales Committee endeavoured to fix the quantity of coal to be purchased by the gas undertaking, so in the Stretford case it would appear that the District Coal Board is also to be the judge of the quality of the coal which is to be consumed.

The lessons of these two cases are further emphasized by the third case—*i.e.*, that of the Newcastle-upon-Tyne and Gateshead Gas Company. The complaint of the Newcastle Gas Company related mainly to price, and it was alleged that, although the Sales Committee of Durham were content with the pithead price obtained for coal delivered coastwise, the same pithead price was not considered to be sufficient in cases where coal was carried to local gas undertakers by road or rail. Little explanation seems to have been offered by the Sales Committee in favour of this anomaly, but according to Press reports there was certain vague talk about the competition experienced by sellers of raw coal from gas undertakings. The effect is, however, to deprive the Newcastle Gas Company of its advantages in the vicinity of the Durham coal mines, an advantage which in no small measure has been the factor upon which the industries of Newcastle have been founded. While the importance of delivered prices to the Coal Industry can be appreciated, par-

ticularly if in the district competition is to be avoided, our sympathies are naturally extended to the Newcastle Gas Company, which is to be deprived of the great and material advantages of its geographical position, with, as it seems to us, little legal justification.

While it is fully appreciated that each gas undertaking before a Committee of Investigation must depend upon its particular facts and circumstances, yet it appears clear from a consideration of these three cases that there is little co-ordination between the different Committees of Investigation. There seems to the layman to be little reason why the Gas Consolidation decision should have been one way and the decision in the Stretford or Newcastle cases the other. Some guiding principle must be formulated. It is essential to know what principles are to govern the interpretation of the words "unfair and inequitable," and how far the interests of the coal industry are to be regarded as paramount to those equally important to the country. An independent and impartial Appeal Tribunal has now been constituted by the new Coal Act, and this tribunal is a body well able to establish a code which will be binding upon Committees of Investigation throughout the country. It appears to us that in the interests of the coal consuming public as many appeals as possible should be taken to the Appeal Tribunal, in order that that tribunal may have an opportunity of establishing a comprehensive code which will apply to enquiries of this character.

Benzole Recovery

We have discussed the important subject of the economics of benzole recovery at some length in these columns recently, our latest comments being on two Papers presented to the Eastern District of the Scottish Junior Gas Association—one by Mr. Waller, of Alloa, advocating recovery, the other by Mr. Baird, of Dunfermline, being an argument against recovery. We think we have shown clearly what the Gas Industry is losing if it cannot dispose of the extra coke consequent on benzole recovery, and we have strongly urged the development of the coke market in what, it must be agreed, is a vast field. His fears of the coke market lead Mr. Baird to advocate heavy steaming or the production of more water gas in external plant; and, as we said in the "Journal" for Feb. 8, if the coke cannot be sold, these are the obvious policies—but they mean dearer gas. It will have been obvious from the letter from Mr. Baird published in the "Journal" last week that he had little use for our comments on his Paper, though our remarks—we quote from the letter—"may appear to be convincing to the unitiated."

The fact is, he stated, that the extra coke due to benzole extraction is *not* being sold. In the same issue of the "Journal," also in our correspondence columns, Mr. Firth, of Leeds, put forward the view that coke prices are influenced more by competitive fuels, coal and oven coke, than by the stocks held by an individual gas undertaking. Mr. Firth also referred to Mr. Baird's statement that carburetted water gas made in a water gas plant is uneconomical. In this regard he pointed out—and he emphasizes the point again in a further letter in our issue to-day—that Mr. Baird, in effect, by steaming in vertical retorts "is making water gas and carburetting it with benzole at 11d. per gallon, and it is taking at least a gallon per 1,000 cu.ft. for the purpose." In his letter to-day Mr. Firth also suggests that the Gas Industry is a business, and therefore any market, whether for gaseous, liquid, or solid fuels should be exploited, and while there are open fires using solid fuels it is in our interests to secure as much of the business as possible. This is a view the "Journal" has expressed on very many occasions, emphasizing that the Gas Industry is a products industry.

Another correspondent remarks that at the moment 35 million tons of coal are being used annually in domestic firegrates in this country, whereas out of the coke sales of 8 million tons per year only about 1 million tons are being used on open fires. "If the recovery of benzole," he observes, "increases the available saleable coke to 10·5 million tons per year, surely the Gas Industry should have no difficulty in selling this extra quantity of 2½ million tons when there is so big a market, bearing in mind the fact that, generally speaking, the domestic consumer pays less for coke than coal."

It would appear that the disposal of coke does not present the same difficulties in the South of England as it does in Scotland, and it is encouraging to turn to the speeches of chairmen at recent annual meetings of gas companies in the South. "Coke," said Sir David Milne-Watson at the meeting of the Gas Light and Coke Company, "plays an increasingly important part in our commercial activities and our finances. The past ten years have seen a very great improvement in the quality and standardization of coke sold and also in the range and efficiency of coke-burning appliances. This progress is the direct result of technical research and marketing organization carried out under the auspices of the London and Counties Coke Association. As a result, the production of coke for sale in the South has increased during this period by nearly 1,000,000 tons." Referring to the record sales of coke by the South Suburban Gas Company, Mr. Frank H. Jones pointed out that coke as sold to-day is a very different product from the coke offered for sale twenty years or so ago. "It has," he said, "become almost a refined product, sold to definite standards and backed by a service organization which makes it the best and most economical fuel for open fires and boilers, in addition to which it has the overwhelming advantage of being smokeless." Mr. Jones also referred to the installation of benzole plant, which he described as "a satisfactory revenue-earning asset." Alderman F. E. Beddow, Chairman of the Portsmouth and Gosport Gas Company, spoke of the growing popularity of the gas-ignited domestic coke fire in the Company's area, and mentioned that the Directors were considering a scheme whereby the production of benzole would be largely increased in future. Mr. G. H. Boucher, Chairman of the Bristol Gas Company, commented on the Company's increasing coke sales. At the meeting of the Croydon Company, Mr. William Cash, dealing with the revenue from residuals, observed that "there they had done very well, partly as a result of nearly doubling their output of benzole, which was a profitable market and should do as well in the present year as it had during the past."

The Right Attitude

With regard to the outlook generally, there was nothing ambiguous about what the Chairman (Mr. William Cash) of the Croydon Gas Company told the proprietors at the recent annual meeting, as reported in last week's issue of the "Journal." He has every confidence in the future of the Gas Industry as a whole, and in the Croydon Company in particular. That is the frame of mind in which to tackle such problems as may lie ahead. Like other undertakings, the Croydon Company have to face-up to a considerable increase in expenditure upon coal during 1939—an increase which the Chairman stated would be equivalent to something like £15,000. But against this there will be some gain from the fact that the Company's Pension Fund is now very nearly solvent from an actuarial point of view, and so will not re-

quire in the current year an allocation upon the same scale as in the past. Nor will it be necessary to place the same amount to the Renewal Fund as was done in 1938.

More fortunate than many gas undertakings, the Croydon Company, faced by these circumstances, are able to avoid, at any rate for the time being, making any increase in the price of gas. In the matter of consumption, too, they are in the happy, though by no means general, position of being able to record an increase—albeit an exceedingly modest one—for the past twelve months. The number of consumers continues to increase in a highly gratifying manner, and the piping of new premises for gas proceeds apace. Even in a residential district like Croydon, the consumption of gas for industrial purposes shows an increase of 10 million cu.ft., bringing the total consumption under this head up to 164 million cu.ft. Central heating is finding favour, and last year's consumption for this purpose exceeded 31 million cu.ft.

Increased Sales

PROGRESS all along the line was also reported at the annual meeting of the Portsmouth and Gosport Gas Company, when Alderman F. E. Beddow, the Chairman, had a stimulating story to tell, as recorded in the "JOURNAL" last week. In this case the Directors were able to report increased sales of gas in both areas of supply, the improvement being equal to over 2% for the whole undertaking. Here, again, the number of consumers has greatly increased during the past year; and heavier expenditure on new mains has been necessary to meet the ever-increasing demand for gas in the new building estates throughout the Company's area of supply. As a matter of fact, in consequence of the many housing schemes which were commenced during 1938, the Company put in approximately 32 miles of new services. The popularity of the gas-ignited domestic coke fire continues to increase, and, also on the residuals side, satisfactory sales of tar and benzole were recorded.

Confronted by heavier costs, the Portsmouth Company have found themselves obliged to make a small increase in the charge for gas, but the Chairman pointed out that, even with the addition of 0·6d. per therm, the highest rate charged to consumers in the city area is still as low as 7·6d. per therm, and in the case of the large consumer there is a graduated scale of prices in operation by which this figure is reduced to 4½d. per therm. And, be it noted by the consumers, highly favourable as are these terms to the users of gas, the stockholders of the Company will also be affected by this increase of 0·6d. per therm in the price, as they will suffer a compulsory sacrifice—like the increase in price, only a very small sacrifice, it is true—of 1s.% off the dividend payable on the consolidated stock. This community of interest is surely a point of which it would be difficult to make too much.

Another Tale of Progress

THE report of the proceedings at the annual meeting of the Bristol Gas Company, which appeared, along with the two already referred to, in last week's "JOURNAL," also makes cheerful reading. There is a brightness about the present, and about the future, at Bristol over which it is impossible for the advent, or the prospect, of higher costs to cast a shadow. As was shown by the Chairman, Mr. George H. Boucher, these rises in costs are serious, and the consumers must be made thoroughly well acquainted with them, because they necessitate a small upward adjustment in the price of gas. But it is impossible to imagine that this trifling addition will do anything to put the brake on the progress of the undertaking. The Company are proposing, in order to provide in part for the extra expenditure confronting them, to make their normal price 8d. per therm, instead of 7·7d., which represents an increase of only just over ¼d. per therm. As the Chairman pointed out, individually this is a negligible increase. To the domestic consumer using an average amount of gas, it will mean asking him to pay about 3d. a month more for his gas than in the past.

And what is the progress of this Company, which it is so confidently anticipated will go on unchecked? During the past ten years (including 1938, when the increase was 4,013) there has been an average yearly increase of 4,000 consumers. In the past year there was an increase of 70 million cu.ft., to 4,158 million cu.ft., in the quantity of gas sold. Since 1916, in fact, there has been an increase of over 50% in the amount of gas sold. It is particularly satisfactory to note that the increase in sales has extended to every department of the Company's business—domestic consumption, industrial load, and street lighting. Indeed, one very striking development during the past year was the considerable increase in the Company's industrial gas sales. The Chairman was able to say, too, that the prospects for further increases in the industrial load are most encouraging. Central heating by gas, and the new method of heating public buildings and works by radiant panel heaters, are now becoming extensively adopted.

Design for Chimneys

WHEN commenting upon the D.S.I.R. Report, in our issue of Feb. 15, reference was made to the formation of the British Coal Utilisation Research Association, a body which seems to possess a marked flair for publicity. The first-fruits of the research work sponsored by the Association have just been given to the Institute of Fuel in the form of a Paper by Dr. P. O. Rosin, who has been working under the auspices of the B.C.U.R.A. at Imperial College. This investigation is of peculiar interest to all who produce fuel for use in the domestic open fire, whether a gas fire or a solid fuel fire. It consisted in an investigation of the flow problems in a fireplace in the light of the earlier fundamental work of Count Rumford during the closing years of the eighteenth century. The flow problems involved (1) the flow of air for combustion to, through, or past the fuel bed, (2) the ventilation of the room, (3) the flow of air into and up the chimney, and (4) the flow of air out of the chimney; the first three of these problems were the subject of Dr. Rosin's Paper.

Possessing a wide experience of methods of solving engineering problems by the use of models, Dr. Rosin decided to use a small-scale representation of a fireplace, room, and chimney in which combustion was simulated by solution, and the flow of air up the chimney by the sinking of heavy salt solution through water. The flow was made visible by using dyes, and by the simple device of turning the photographs upside down the eye was made to believe that it was witnessing the upward flow of a current of air. It is well known that if the flow of one fluid is to be represented accurately by another there must be similarity in the mathematical sense between the two systems. Dynamic similarity is achieved by arranging that the two systems shall have equal Reynolds numbers and equal Froude numbers; geometric similarity is obtained if the ratio between corresponding lengths is constant; neither chemical similarity nor ther-

mal similarity exists between solution and combustion. There is thus not complete similarity, and to that extent there must be some doubt as to the absolute validity of the experiments. This doubt can be removed only by applying the results and conclusions drawn from the model to actual fireplaces. This work is now being tackled by the B.C.U.R.A., and all that can be said at the moment is that in the few instances in which Dr. Rosin has been able to apply his conclusions the results appear to have been eminently satisfactory. There is thus reason for deeming the research to be worthy of careful examination.

The flow of air up the chimney and the flow of air from the room to the chimney were followed by a cinematograph film which was shown to the meeting of the Institute of Fuel. Without going into the details of the experiments and of the mathematical discussion of the basis of the apparatus, full particulars of which were given in Dr. Rosin's lengthy Paper, it may be stated that the principal conclusions on chimney design and ventilation were as follows: (1) The present chimneys of 50 or 81 sq.in. as laid down by local by-laws are altogether too wide and give rise to an unnecessary number of air changes per hour. (2) A narrow chimney gives 2 to 3 air changes per hour, which is quite sufficient, whereas the present wide chimney may give 7, 8, or more air changes per hour. (3) The present method does not properly ventilate a room; it is necessary to admit fresh air near the top, since, if the air enters near the floor, the legs of the occupants are bathed in fresh air, the velocity in this zone being the maximum, while towards the upper part of the room the air is stagnant and is unaffected by the chimney. According to these results, our vaunted ventilation by the open fire is a complete delusion. (4) The chimney shelf causes eddies which may blow smoke back into the room, and should be replaced by a gently-sloping chimney back at this point. (5) The rising hot products of combustion in the normal design of chimney keep close to the fire-back and chimney-back, whereas the cold air which has not passed through the fire keeps to the front of the chimney in streamline flow (unless caused to eddy by faulty construction), and thus cools the front of the chimney in contact with the room and reduces the heating effect of the fire. (6) The fire-back should be so designed as to be as hot as possible and should preferably be convex and not possess an exaggerated slope.

Ventilation and the Gas Fire

THESE conclusions, as has been pointed out, require confirmation, but if found to be correct they appear to support the gas fire. The narrow opening into a gas fire flue restricts the number of air-changes per hour to the smaller number that is sufficient for health and more conducive to the efficient use of the fuel. It must not be forgotten that expenditure of fuel is necessary to secure added flow of air through the room. Moreover, on account of the restriction of the opening, it would be expected that the hot products of combustion and the air would be mixed and in that way the air would become heated and there would not be the stratum of cold air along the room side of the chimney which Dr. Rosin finds in the existing solid fuel fire. Thus, the present design of gas fire chimney seems to be conducive to comfort and to the economical use of fuel. That is a most important fact, for the possibility of the all-gas house depends upon the efficient use of fuel in order to counteract the difference in price per gross therm between gas and coal supplied at the meter or coal-cellar. There is some confusion of thought in regard to the narrow chimney inlet of the modern gas fire, and research which would put this problem on a sound scientific basis has long been desirable.

The advocacy of the narrow chimney seems to be on less sure ground when dealing with solid fuel fires, and particularly with coal fires. Dr. Rosin's experiments have been conducted under what may be termed "ideal" conditions. He has in effect a smooth and perfectly clean chimney, and has taken only rate of flow and design of brickwork as his variables. In practice, of course, the chimney is not smooth, and there will be losses by friction. With the 20-in. chimney which, in Dr. Rosin's words, "can easily take up and convey the combustion gases of the open fire," how great will be the frictional losses? The smokeless coal fire is not yet within sight, and we have to cater for soot deposits. Even with coke there are found deposits of ash in the chimney, and although the rate of growth of these deposits is slow, there will nevertheless be a frictional loss arising from them. The narrow chimney may be sound on theoretical grounds, but will it be found to be sound on practical grounds?

There is less uncertainty regarding the flow of ventilation air through the room, and experience has already shown that in certain houses where the practice recommended by Dr. Rosin of admission of air from the ceiling level has been tried, added comfort has resulted. In one particular house, part of the passages are occupied with a mezzanine floor which forms an air duct which distributes the air either cold in summer or warmed in winter to each room from ceiling level. It is found that the air in the rooms always remains pleasant even when no fire burns in the grate; and when the house is unoccupied for long periods it does not become "musty." Clearly, the open fireplace—whether gas or solid-fuel fired—must be associated with properly-designed air admission. Just how the influx of air from beneath the door and at other places on ground level is to be prevented is another problem.

The aerodynamics of combustion in a grate were also investigated by Dr. Rosin, and most engineers will agree that relatively incombustible fuels like coke and anthracite cannot be burnt successfully in a hearth-bottom grate—although Professor Boys maintained ("JOURNAL," Nov. 19, 1924) that they should be so used—but that a stool grate is necessary. He further insisted that a stool grate should be completely closed below by a fret or fender having adjustable openings through which the combustion air is admitted; this type of grate then "possesses a remarkable degree of flexibility." Dr. Rosin further declared that "dampers in the chimney cannot be considered as effective means of regulating the rate of burning, for the hearth-bottom grate does not react at all to the damper, and its effect on a stool grate in a fireplace of normal opening and with medium air-changes is only slight. The chief result of the damper is the regulation of the quantity of ventilating air." It will be remembered that Drs. Davidson and Hartley in their Paper at the last Autumn Research Meeting of The Institution of Gas Engineers concluded that "the rate of initial kindling and recovery after re-fuelling, of an open coke fire . . . or its rate of combustion or radiant efficiency, will be unaffected by the variations of the draught which are usually obtained with domestic chimneys." These three experimentalists are therefore in agreement as to the effect of chimney draught on the combustion of a coke fire; clearly, for the open fire "draught" in the sense of the chimney pull has very little influence on the combustion of the coke, and those interested in using the less combustible fuels in the open grate must look to design of the grate and to methods

of improving the combustibility of their fuel, and not to the provision of high and hot chimneys, as methods of improving performance.

Holding Companies

As will be seen from our news columns, Lord Onslow, Chairman of Committees in the House of Lords, is to propose to the House the appointment of a Select Committee to investigate the effect of the acquisition by holding companies of statutory gas, water, and electricity undertakings. The motion is to be put down for consideration by the House on March 14.

The "Gas Salesman"

Published last week the February issue of the "Gas Salesman" contains several bright and interesting feature articles. There is a helpful "Conversation Piece on Advertising," which has been specially contributed; the load value of appliances is discussed in another article; and Mr. W. J. Browning continues his series of "Notes for Coke Salesmen." Then "Columbus, Jr.," presents in his popular style "American Notes and Notions" and there is the usual feature "A Woman's Viewpoint." The news of the month is given its place—and a very attractive place, too—and the needs of the industrial gas salesman are catered for. Finally, there are reports of the activities of the Salesmen's Circles—in this issue occupying 13 pages.

Personal

Mr. Barker Mitchell, Engineer and Manager of the Bangor (Co. Down) Gas Department, has received permission from the Civil Service Committee to retire as from April 1. At the last meeting of the Borough Council, Councillor F. Logan, Convener of the Gas Committee, said that since Mr. Mitchell's appointment in 1901 the make of gas had increased from less than 8 million cu.ft. to over 240½ million cu.ft. in 1938. When Mr. Mitchell took over the price of gas was 3s. 9d. per 1,000 cu.ft.; to-day it was 3s. 2d., less discounts varying from 5 to 25%, notwithstanding that the cost of coal was now double the price it was in those early days. There were now 6,000 consumers against 567, and the yearly income had risen from £1,851 to £46,081. There were at present some 55 miles of gas mains in the Borough, and the staff had increased from 4 to 60. Something in the neighbourhood of £150,000 had been spent on the Undertaking since Mr. Mitchell's appointment. Mr. Mitchell had built up one of the most successful gas undertakings in the country, and his achievement was appreciated by the inhabitants of the borough as a whole.

Tributes to Mr. Mitchell's worth were paid also by Alderman T. H. Gray, J.P., who presided in the absence of the Mayor (Alderman Dr. Bowman); Councillor Davidson, Alderman T. Bailie, and Councillors William Bailie, W. H. M'Millan, and John S. M'Cullough.

* * *

It is learned with regret that Mr. John Wilson, Engineer and Manager of Dundee Corporation Gas Department, is at present seriously ill in the Macalpine Nursing Home, Glasgow, and his many friends in the Gas Industry will wish him a speedy recovery to health.

* * *

At a meeting of the Board of the Shrewsbury Gas Light Company in London on Feb. 21 Mr. F. G. Corser and Mr. C. M. D. Belton were elected Directors. Mr. Corser was a member of the Board before the acquisition of the Shrewsbury Company by the Severn Valley Gas Corporation, Ltd.

Mr. Belton has been Engineer, Manager, and Secretary of the Company for the past twenty years, a position which he retains. He has been in the service of the Company altogether nearly thirty years, and since he has been in charge sales of gas have increased 45%, while the whole of the works have been re-modelled and brought up-to-date.

Obituary

The death has occurred of Mr. William Adams, who for the past forty-three years was a Director of the West Kilbride (Ayrshire) Gas Light Company and Chairman for the past thirty-eight years.

* * *

The death occurred at Letchworth, Herts., on Feb. 20, of James Gibb Stewart, D.Sc., in his 59th year. Dr. Stewart was head of the Stigma Instrument Company, and had devoted the greater part of his life to a study of the laboratory requirements of the Gas Industry. A number of his inventions are well known and in daily use.

* * *

Mr. W. H. Mainwaring, who was Engineer and Manager of the Lincoln Gas Department from 1915 until his retirement in 1930, died on Feb. 19 at his home, Noyna, St. Catherine's, Lincoln, after a short illness.

His career with the Undertaking began 56 years ago, when it was owned by a Company, and he passed into the Corporation service when the Undertaking was acquired by the Municipality. He became Manager of the Department on the death of Mr. John Carter in 1915, after acting as Mr. Carter's assistant for many years. At one time Mr. Mainwaring was Secretary and Treasurer of the Eastern Counties' Gas Managers' Association, retiring in 1928 after seven years' service.

"Gas Journal" Directory

In order that readers may be able to keep the particulars contained in the "Journal" Directory up to date, we summarize in the following list various changes during the past month:

Page 14. CALVERLEY. J. McLusky, E. & G.M., resigned.
„ 30. HALIFAX. J. McLusky appointed E. & M. vice W. B. McLusky retired.
„ 30. HARROGATE. F. W. Allum appointed S. vice A. I. Seaton retired.
„ 62. SHREWSBURY. C. M. D. Belton appointed D.
„ 136. VICTORIA, B.C. Sales, 152 mill.; consumers, 4,732.

Forthcoming Engagements

March

2.—**Midland Juniors.**—Paper by F. N. Tidball, "Structural Principles in the Design of a Waterless Gasholder."
4.—**Manchester and District Juniors.**—Annual Dinner. Paper by E. Bates, "Operation of Intermittent Vertical Chamber Ovens Combined with Coke Dry Cooling Plant."
6.—**I.G.E.**—Joint Committee on Complete Gasification under Pressure, 2.30 p.m.
6.—**L.C.C.A.**—Technical Committee, 11.30 a.m.
7.—**B.C.G.A.**—Executive Committee, 2.30 p.m.
7.—**I.G.E.**—Meters Committee, 11 a.m.
7.—**I.G.E.**—Research Executive Committee, 2.30 p.m.
9.—**B.C.G.A.**—Annual Meeting of Members in Eastern District at Cambridge.
9.—**I.G.E.**—Ad Hoc Joint Committee on Research, 11.15 a.m.
9.—**Midland Association.**—Spring General Meeting. Presidential Address of G. C. Pearson.
10.—**L.C.C.A. (Distributors' Branch).**—Central Committee, Gas Industry House, 2.30 p.m.
11.—**Scottish (Western) Juniors.**—Visit to Dixon's Coke Ovens, Govan Hill, Glasgow.
13.—**I.G.E.**—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.
13.—**L.C.C.A.**—Finance Committee, 10.45 a.m.; Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.
13.—**Scottish (Eastern) Juniors.**—Visit to Newbattle Colliery of the Lothian Coal Company, Ltd.
14.—**I.G.E.**—Council Meeting, 10 a.m.; Special General Meeting, for the Presentation and Discussion of a Paper on "The Deterioration of Coal on Storage," by James Jamieson and W. J. Skilling, 6 p.m.
14.—**London and Southern Juniors.**—Paper by L. F. Randall, "The Servicing of Gas Apparatus."
15.—**B.C.G.A.**—Scottish Conference at Saltcoats.
15.—**I.G.E.**—Board of Examiners, 10.30 a.m.
15.—**London and Counties Coke Salesmen's Circle.**—Meeting at Gas Industry House, 2.30 p.m. Paper by G. Dougill, "Coke from the Production Side."
15-16.—**B.C.G.A.**—District Conference at Bedford.
16.—**I.G.E.**—Refractory Materials Joint Committee, 2.30 p.m.
16.—**Midland Juniors.**—Visit to Staveley Coal and Iron Company, Ltd., Chesterfield.
17.—**B.G.F.**—Joint Exhibition Committee, 3.30 p.m.

Letters to the Editor

Economics of Benzole Recovery

SIR,—I read Mr. Baird's further letter in your issue of Feb. 22, and his remarks "after all it is a *Gas* Industry—or isn't it?" would appear to suggest resentment at being purveyors of coke; but ours is a business, and therefore any market, whether for gaseous, liquid, or solid fuels, should be exploited, and while there are open fires using solid fuels it is in our interests to secure as much of the business as possible.

His command of simple arithmetic would appear to have misled him in his analysis of Mr. Waller's figures with respect of the gas yield before and after benzole extraction.

To one who is so sensitive to the fact that it is impossible to get something for nothing, it must have been an oversight to forget that, of the reduction of 10 therms in the yield per ton for an extraction of 2 gallons of benzole, at least 7 therms were water gas, and had required an expenditure of both coke and steam to produce, but unfortunately he saddles benzole with the whole of the expense.

Briefly, those extra 10 therms per ton, obtained when not recovering benzole, were blue water gas carburetted with benzole, which is not an economic carburetting proposition.

Mr. Baird, in giving his figures for the increase in coke production when recovering benzole must have overlooked the fact that coke production occurs in any expansion of gas sales.

Yours, &c.,
F. FIRTH.

Meadow Lane Gas-Works,
Leeds,
Feb. 25, 1939.

SIR,—The controversy between Messrs. Waller and Baird as to whether benzole extraction pays appears to be no nearer a settlement than when it started, probably due to the lack of recognition on both sides that local conditions are the determining factors. Mr. Waller may be quite right that it pays at his works and under his local conditions. Likewise, Mr. Baird may be equally right on the other side.

I am in the position of controlling two works each turning out the same quality of gas from similar coals but with different types of carbonizing plant and benzole plant. *Works "A,"* the larger, has upward-heated continuous vertical retorts and a rotary benzole washer. *Works "B,"* the smaller, has intermittent vertical retorts and a tower scrubber on the benzole plant. Both works turn out a 500 B.Th.U. gas and both carbonize washed single Yorkshire Gas Nuts of the same quality.

I have taken out the costs for both works on present-day prices and on our actual working results. All charges, including repairs of retorts, water, steam, labour, repairs to plant, interest, and depreciation, have been taken into account; also, allowances have been made for the reduced thermal yield consequent on making a higher quality of gas to permit of benzole being extracted. The basis in each case was a given quantity of gas of the quality required for distribution. The gas turned out must be the starting point and not so many tons of coal carbonized.

From the actual costs of our present working, complete balance-sheets have been prepared from no benzole extraction up 2½ gallons per ton.

The final results are interesting, as, *in our case,* at *Works "A,"* with continuous vertical retorts, benzole extraction only begins to yield a surplus profit at 1½ gallons per ton. Below this yield it definitely does not pay us. At *Works "B,"* with intermittents, benzole extraction pays us when the yield exceeds one gallon per ton.

A further point is revealed that the surplus profit per gallon is greater with the intermittents than with the continuous verticals for a given yield per ton.

The essential difference between the two works is in the carbonizing plant.

The intermittents produce a high quality gas which can be stripped of benzole without having to alter the throughput and materially alter the heats.

On the other hand, the working of the continuous verticals has to be varied as regard throughput and steam to produce a richer gas suitable for benzole washing and the thermal yield is reduced to a greater extent than with the intermittents.

Again, the quality of the benzole obtained from the continuous verticals is not so good as that from the intermittents. In works using horizontal retorts, the quality is even better than in the case of intermittents.

It is unsafe to dogmatize on the subject of benzole extraction and say that it does not pay, and each one must determine for himself whether it does by making a *complete* balance-sheet with and without benzole extraction based on a definite output of gas of standard quality in each case, and taking the many variable factors into account.

In our case, *Works "A,"* with continuous verticals, is producing 2 gallons per ton and *Works "B,"* with intermittents, is producing 2¼ gallons per ton and both are paying.

Yours, &c.,
FRANK H. ROBINSON.

Bishop's Stortford,
Feb. 25, 1939.

SIR,—During the last few weeks there has been much conflicting evidence among the experts in the Gas Industry as to the economics of benzole recovery.

The major argument in favour of benzole recovery is that there is an unlimited field for the expansion of coke sales which in itself would increase gas sales, as the modern coke fires are ignited by gas.

At the moment 35 million tons of coal are being used annually in coal fires in this country, whereas out of the coke sales of 8 millions tons per year only approximately 1 million tons are being used on open fires.

If the recovery of benzole increases the available saleable coke to 10·5 million tons per year, surely the Gas Industry should have no difficulty in selling this extra quantity of 2½ million tons when there is so big a market, bearing in mind the fact that, generally speaking, the domestic consumer pays less for coke than coal.

That there are large stocks of coke in this country is not to the Gas Industry's credit, and it is time that they got busy with the small consumers of coke and educated them into the advantages of coke fires, and reduction of air pollution.

Mr. Baird talks proudly of using gas fires instead of solid fuel fires, but one presumes that as a member of the Industry he does not pay approximately 10d. per therm for gas; how many of the huge percentage of people with incomes of under £250 per annum can afford to heat their homes at 10d. per therm?

It does seem a pity to me that there are members of the Gas Industry who, despite the fact that they can show a profit in benzole recovery, hesitate to go forward because they are scared of the value of coke falling; if the value of coke falls, is it not possible that coal will also take a corresponding drop in price?

Would one assume that if Dunfermline were given a chance of a large industrial gas load at, say, 4d. per therm, they would turn it down because they were afraid of overburdening themselves with coke?

After all, Mr. Baird says it is primarily gas sales that we are after and a benzole plant is virtually an industrial consumer of gas and a very valuable one at that, as it can be cut off if there is a sudden increased demand for gas on the district.

There are about 13,000 gas consumers in Dunfermline, and if they used 1 cwt. of coke per week each for, say, 26 weeks, there would be a demand for 16,900 tons of coke per year, whereas at present Dunfermline have only 11,400 tons of coke and breeze available for sale.

Yours, &c.,
"GAS AND COKE MINDED."

Feb. 24, 1939.

Institution of Gas Engineers

Members of The Institution of Gas Engineers will be welcome at a meeting of the Illuminating Engineering Society to be held, by kind permission, in the Lecture Theatre of the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, on Tuesday, March 7, 1939, at 6.30 for 7 p.m. Light refreshments will be served at 6.30 p.m. A Paper will be read by Mr. R. F. Taylor and Mr. K. Cheesman (of Pilkington Brothers, Ltd.) entitled "Some Uses of Glass in Illumination," and will be followed by a discussion. Tickets for this Meeting can be obtained on application to the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1.

Copies of the following recently issued British Standard Specification can be obtained on application to the Secretary at a cost of 2s. each: No. 825-1939, Mild Steel Shackles for Lifting Purposes.

News of the Week

Gas is to be Employed at the new Broughton baths, it is reported by Mr. F. H. Goodwin, Engineer and Manager of the Salford Gas Department.

A Reduction in the price of gas instead of an increase was forecast by the Mayor of Loughborough at the annual dinner of the Corporation Gas Department.

An Extension of Gas Mains at a cost of £2,300 at Middlefield in view of the development of housing was proposed by the Aberdeen Gas Committee on Feb. 22.

A New Record for gas distributed was set up at Darlington in January. During the month, 73,730,000 cu.ft. were distributed as compared with 71,427,000 cu.ft. in December, which figure was also a record.

In Its Five-Year Plan, Stoke-on-Trent City Council proposes to spend £130,450 on the Gas Undertaking, of which sum £100,000 will be required for a new gasholder for the City. The expenditure of this sum will involve no charge on the rates.

Notice is Given by the East Surrey Gas Company that the price of gas will be increased by 1d. per therm as from the next reading of meters after Feb. 10, 1939. This is rendered necessary by the increased cost of coal, other materials, and labour.

We Have Received from the Association of British Chemical Manufacturers a copy of Supplement No. 2 to the Second Edition of the Index to Acts of Parliament and Statutory Rules and Orders affecting the Chemical Industry. Copies, price 6d. each, post free, can be obtained from the publishers, W. Heffer & Sons, Ltd., Cambridge. Remittance must accompany orders.

Among the Objects of a Special Order for which the Dursley Gas Company (1938), Ltd., intend to apply to the Board of Trade, under the Gas Undertakings Acts, 1920 to 1934, is the transfer to and vesting in the Company of the gas undertaking of the Dursley Gas Light and Coke Company. The Dursley Undertaking is a Constituent Company of the South-Western Gas and Water Corporation, Ltd.

An Address on the British Gas Industry was given by Mr. J. H. Canning, O.B.E., J.P., Engineer and Manager of the Newport (Mon.) Gas Company, to the South Wales and Monmouthshire Branch of the Chartered Institute of Secretaries, who met at Newport on Feb. 21. Towards the conclusion of a comprehensive and highly interesting address, Mr. Canning referred to recent concessions made by his Company to consumers. The most recent of these, he said, was the two-part tariff for domestic consumers, which enabled the consumer, after the payment of a moderate fixed charge, to obtain gas at half-price. The tariff had been expressly framed in order to bring all the advantages of gas within the compass of a moderate purse. The Company was in a position to furnish ample supplies of gas for industrial purposes, the tariff for which depended principally upon the quantity of gas consumed per annum and the load factor.

The Result of the Airdrie Plebiscite has now been declared. The plebiscite was held to ascertain the opinion of the ratepayers on the future of the local municipal gas undertaking and has resulted in a large majority voting for retention of the works by the Burgh as against an offer for its acquisition by the Coatbridge Company. The result of the plebiscite was declared on Thursday at the Town Clerk's office, when the total number who inserted "no" on their papers was 2,646, and "yes" 758. Two years ago it was intimated by the Airdrie Gas Manager that the present plant was running at a loss and thereupon negotiations were opened with the Coatbridge Gas Company, in which they offered to pay off an outstanding loan debt of £20,000 and supply gas to Airdrie consumers at the Coatbridge rate which would effect an annual saving of £8,000. It was contended by certain members of the Airdrie Town Council that if new plant was installed, the town would be in a position to supply gas at approximately Coatbridge rates, and that to sell the Works would mean a loss in rates, as much of the municipal plant would not be required by the Coatbridge Company. At the time when the decision to take a plebiscite was set afoot, negotiations were being considered for the purchase of new vertical retorts costing £30,000, and these negotiations will now be re-opened.

The Calorific Value of gas supplied by the Bradford Gas Department as from June 5 will be 475 B.Th.U.

Increase in the Price of Gas as from June next of 3d. per 1,000 cu.ft. has been advised by the Skegness Gas Committee. The recommendation will be considered at the next meeting of the Town Council.

A Benzole Extraction Plant is to be erected by the Hinckley U.D.C. at their Gas-Works in a bomb- and blast-proof building, at an estimated cost of £3,000. The Council have now received formal sanction from the Ministry of Health for the raising of £2,990 for the laying of new mains.

We learn that Mr. Reginald V. Farnham, M.I.Mech.E., Consultant and Fuel Technologist, has recently been appointed Managing Director of Jorham Carbonisation, Ltd., of Regent Chambers, Barnsley. The Company is to erect and operate a low-temperature carbonization plant designed by Mr. Farnham.

Application for a Special Order, under Section 10 of the Gas Regulation Act, 1920, is intended to be made to the Board of Trade by the Bridgnorth Corporation. An object of the Order is to obtain power for the Corporation to compel consumers to repair any internal piping, appliance, or other fitting in case of danger.

Extensions to the Penrith Gas-Works are to be undertaken by the Urban Council at a cost of £14,000. Some weeks ago the Council approached consumers to use less gas as the demand was exceeding the supply. It is proposed to erect a new retort setting, exhauster, steam boiler, and gasholder, with a capacity of 340,000 cu.ft.

At the Next Meeting of the Institution of Chemical Engineers, to be held on Tuesday, March 14, at 6 p.m., in the Rooms of the Geological Society, Burlington House, Piccadilly, W.1, a Paper on "Problems of Compressors and Compressed Gases in Industry," will be presented by Mr. R. L. Quertier, B.Sc. (Eng.), M.I.Mech.E. The Chair will be taken by the President, Mr. F. Heron Rogers.

The Range of Goods Offered by the 9,800 exhibitors at the Leipzig 1939 Spring Fair will exceed even the record of last year's Fair. The display of foreign products will also be much larger than in 1938. By the middle of January seventeen collective exhibitions from abroad had been arranged, and negotiations with further foreign countries are practically settled. Foreign merchandise will, according to the latest information to hand, include goods from twenty-eight countries. The Leipzig Fair will be held from March 5 to 13, 1939.

Investigation of Holding Companies

Proposed Appointment of Select Committee

The Parliamentary Correspondent of *The Times* reported on Feb. 24 that Lord Onslow, Chairman of Committees in the House of Lords, is to propose to the House the appointment of a Select Committee to investigate the effect of the acquisition by holding companies of gas, electricity, and water undertakings which operate under statutory restrictions imposed in the public interest. He will move:

> That a Select Committee be appointed to consider in the case of gas, electricity, and water undertakings operating under enactments containing provisions regulating the raising of capital, the borrowing of money, the charges to be made, or the relation between dividends and prices charged, whether the control of or by such undertakings by or of another body (statutory or otherwise) can impair the efficiency of such provisions; and whether, in the case of Bills and Orders relating to any of such undertakings and promoted for the purpose *inter alia* of obtaining or increasing capital or borrowing powers, provisions should be made for the control of the exercise of such powers as to terms or form; and to report what, if any, modifications or additions to the provisions usually inserted in local Acts and Orders should be made with a view to their incorporation in future Bills and Orders relating to gas, electricity, and water undertakings.

This motion is to be put down for consideration by the House on March 14.

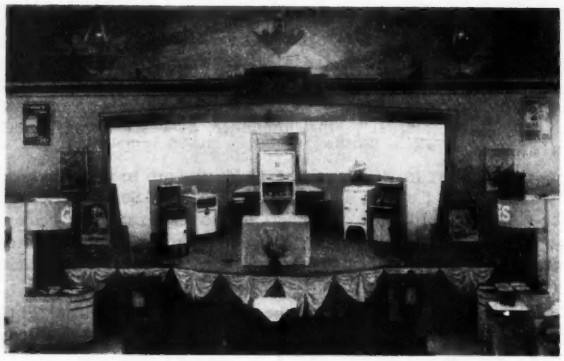
Newcastle Coal Complaint

Hearing Before Central Appeal Tribunal

The Newcastle-upon-Tyne and Gateshead Gas Company have appealed to the Central Appeal Tribunal set up under the Coal Mines Act, 1930, as amended by the Coal Act, 1938, against the decision of the Durham District Committee of Investigation in regard to the price of Durham Coal for the Gas Company. [Reports of the Enquiry appeared in the "JOURNAL" for Nov. 30 and Dec. 12, 1938, and Jan. 11 and 18, 1939.]

The Tribunal, consisting of Mr. J. Norman Daynes, K.C. (Chairman), Mr. E. Furnival Jones, and Dr. A. W. Pickard-Cambridge, will sit in public in the Court Room, Caxton Hall, Caxton Street, Westminster, S.W.1, on Saturday, March 4, for the hearing of the Appeal. The proceedings will begin at 10.30 a.m.

An Attractive Stage Setting



There were record attendances at a recent exhibition organized by the Elland-cum-Greetland Gas Company in the Public Hall, Greetland. The exhibition was opened by Mr. W. B. McLusky, of Halifax, under the Chairmanship of Mr. J. E. Lister Cooper. We reproduce above a photograph of the platform attractively set out for cookery demonstrations and lectures.

Scottish Junior Gas Association

Western District Whist Drive

This event was held on Feb. 18 in "The Georgic," Union Street, Glasgow. Seventy of the Juniors and their friends engaged in twenty hands of whist before tea was served. After tea the company returned to their original room to dance to the music of a band under the direction of a gas man in the person of Mr. J. McGrouther, of the Glasgow Gas Department.

During the evening Mr. R. A. Maclaren (Newton-on-Ayr), immediate past-President, presented Mr. N. C. Sturrock (Greenock), with the President's Medal. Mr. Sturrock, in his reply, thanked Mr. MacLaren for his remarks and Mr. Wm. Kirk (Motherwell) for assistance rendered to the Association before relinquishing office. Mrs. Alex. Bujnowski presented the whist prizes, and was thanked by Mr. E. G. Smith, Vice-President.

Drakes, Ltd.

Annual Report

The report of the Directors of Drakes, Ltd., Halifax, for the year ended Dec. 31, 1938, states that the credit balance on profit and loss account brought forward from last year was £17,064, from which has been transferred to reserve and later allocated to the reduction of freehold land and buildings, as *per* Directors' Resolutions dated Feb. 13, 1939, £7,000—£10,064. The net profit for the year amounted to £10,147, leaving a balance available for disposal of £20,210. The Directors have now recommended the payment of arrears of preference dividend for the period of two-and-a-half years, July 1, 1928, to Dec. 31, 1930, less tax, absorbing net £4,350, leaving to be carried forward to next year's accounts a balance of £15,860.

Street Lighting

The Gas Industry's 800,000 Lamps

Both gas and electrical interests were asked to send a representative to talk on Street Lighting to the members of the Herne Bay Ratepayers' Association at a meeting on Feb. 20.

Mr. W. J. Jones, of the Electric Lamp Manufacturers' Association, spoke for the electrical industry. He dealt with the need for improving street lighting and showed that at Herne Bay they were spending less than the average on public lighting. He then showed a film produced by the British Thomson-Houston Company which illustrated largely by means of models the provisions of the Ministry of Transport Report. The film proved a very excellent means of explaining the more difficult provisions of the Report. Finally, Mr. Jones showed some of the developments in the electric discharge lamp and stressed the interesting effects that could be obtained with the use of ultra-violet light from the 80 watt mercury vapour lamp.

Mr. K. F. Sawyer, of the Gas Light and Coke Company, dealt with gas lighting. He pointed out that the Gas Industry was responsible for over 800,000 lamps in this country and that if these were put out in staggered formation at just over 50 yd. spacing they would extend right round the world. The number of lamps and the gas consumption for public lighting were rapidly mounting. After showing how from earliest times gas lighting had steadily improved in efficiency and had thus kept pace with the increasing demands made upon public lighting as traffic increased, he went on to describe modern types of gas lamps built to provide very effective control of the light emitted. Mr. Sawyer then dealt briefly with the technical background of present-day street lighting and by means of plans and photographs of a road in Brentford showed how the provisions of the M.o.T. Report had been applied, as far as local circumstances would permit, to the lighting of a main traffic route which presented a number of peculiar difficulties. After Group B roads had been similarly discussed, Mr. Sawyer concluded his talk by drawing the audience's attention to the excellent maintenance of street lighting provided by the Gas Industry and emphasized that contracts with public lighting authorities were now being entered into in which a penalty was to be inflicted if the depreciation from initial conditions ever exceeded 20%.

The following two main points were very clear from the subsequent discussion: (1) It was realized that planning street lighting was a job for the expert and not for the layman. In this connexion both Industries offered to Herne Bay, should they require it, the full resources of the laboratories at their disposal. (2) That lighting to the standard, particularly in Group B roads, required by the M.o.T. Report was likely to involve considerable expense which in many instances would not be considered justified. Apparently, some of the audience already knew the prices of a previous tender for the lighting of Herne Bay to the standards advocated in the Report.

There were a number of other questions of a general type concerning street lighting.

Walsall Lighting Scheme

Some little time ago the Walsall Town Council prepared a scheme for improved main lighting at an estimated cost of £4,860, with annual maintenance costs estimated at £1,892. The Ministry of Transport intervened and wanted the scheme improved in order to conform strictly to the recommendations of the Departmental Committee on Street Lighting, which would have advanced the capital cost to £7,395 and the annual maintenance costs to £2,560.

Following this intervention by the Ministry of Transport, the Ministry of Health, replying to an application for loan sanction in respect of the £4,860 scheme, asked the Council to reconsider their proposals in the light of the Departmental Committee's recommendations. Instead of conforming to this request, the Council from their January meeting sent to the Ministry a vigorous protest against the attempt to force on local authorities the adoption of a certain standard of street lighting, without any Government grant towards the extra cost.

It was reported to a recent meeting that the Ministry had written giving their sanction to the loan of £4,860, the original scheme.

New Radiation Cooker

In last week's issue, p. 503, we gave a description of the new domestic cabinet cooker—No. 345 "New World"—brought out by Radiation Ltd.

In setting out the consumptions of the hotplate burners we stated that the consumption of the two Duplex burners for general work was 26 cu.ft. per hour. Actually the consumption of each Duplex burner is 18 cu.ft. per hour.

Athletic and Social

Gravesend Employees' Social Association.

The thirteenth annual dinner of the Gravesend and Milton Gas Light Company was held recently. The President (Mr. W. A. Howie, the Company's Manager and Chief Engineer) was in the chair and was supported by Mr. H. A. Probin (General Manager, South Eastern Gas Corporation), Mr. N. J. Robertson (Chief Accountant to the Corporation), Mr. H. M. Close, Mr. W. A. Hammond (Secretary, Gravesend and Milton Gas Company), Mr. A. Warr King (Accountant), Mr. O. R. S. Ingham (Assistant Manager), Mr. J. H. Hornby (Engineer and Manager, Maidstone Gas Company), Mr. H. Tuffee, Mr. Guy Mumford, Mr. Townsend, Mr. M. Jones, Mr. A. E. Tidby (Chief Clerk), Mr. W. Pickering, Mr. J. Stevens (Secretary, Sports Section), Mr. H. J. Mitchell, Mr. Wilfred Hammond, Major G. Sunnucks, Mr. J. A. Brentnall, Mr. F. W. Tunbridge, Mr. R. Cook, Mr. W. Cutler, and Mr. G. Draper (Gravesend Meter Company), Mr. F. C. Bedloe (Messrs. Drakes, Ltd.), Mr. J. Stedman, Mr. R. Appleton, and Mr. C. Fox, Mr. E. Vaughan (Chairman of the Employees' Social Association), Mr. A. W. Simmons (Hon. Secretary), and Mr. F. S. Howcroft (Hon. Treasurer). Several of the pensioners of the Company, former members of the Association, were also present as guests. Great regret was expressed at the absence of the two local Directors, Mr. J. B. Lingham, J.P., and Mr. H. A. Porter, J.P.

The toast of "The Gravesend and Milton Gas Light Company" was proposed by Mr. W. A. Hammond, who said that during the year death had robbed them of one of the staff, Mr. Bernard Warner, who had served the Company faithfully for 32 years. They also deplored the passing of a good old friend and late Deputy-Chairman of the Old Company, Mr. William H. Troughton.

The wisdom of the Directors in deciding to install additional carbonizing plant, so ably put into practice by Mr. Howie, was proved during the very severe weather at Christmas time. Every record was broken in the amount of gas sent out, the highest amount sent out being 831,000 cu.ft. in one day. Great credit was also due to the workmen who so energetically had worked and proved that their slogan was still holding good—"Gas never lets you down." During the five years the Company had been controlled by the South-Eastern Gas Corporation their mains had extended in many directions, Chalk, Higham Road, Castle Lane, and Singlewell now being supplied with gas.

Every help was gladly given by the General Manager, Mr. H. A. Probin, Mr. Robertson, and all the staff of the South-Eastern Gas Corporation.

Replying, Mr. H. A. Probin pointed out how all the employees could help in smoke abatement by interesting as many people as possible in smokeless appliances. Only a few could be employed on the sales side, but indirectly all of them could be salesmen for the Gas Industry.

Mr. A. Warr King proposed the toast of the "Employees' Social Association." The Employees' Social Association spelt the unity of interest of the employees and those whom they served. How well the employees did their work was well known and appreciated by those who had the managerial responsibility. "I have seen managers come and go," said Mr. King, "but I have never seen a manager who produced so much warmth for the benefit of the town and kept so cool himself on all occasions as Mr. Howie."

Mr. E. Vaughan, who replied, thanked the Directors for their continued support, which to a large extent made possible those dinners and the summer outings.

Mr. W. A. Howie gave the toast of "The Guests," Mr. F. C. Bedloe responding. Mr. Harold Tuffee also replied in witty fashion.

Once again an excellent entertainment was provided by the Association's own party, "The Gas Bags."

South Suburban Children's Party.

Some 200 children and their parents were entertained at tea at the annual party, organized by the Committee of the Cray Works Social Club of the South Suburban Gas Company.

After tea there was the pantomime, "Cinderella and Her Crystal Slipper," written and produced by Miss Madge Penney. During the interval each child was presented with a toy or present (according to age).

Among those present were Mr. T. Brown (General Manager and Secretary), Mr. V. Simmonds (Engineer), Mr. A. Ross and Mr. H. Weatherley (Employee Directors), Mr. S. Hooker (Co-Partnership Secretary), Mr. S. Hollman (Chairman of the Sports Guild), Mr. J. A. Rudling (Works Superintendent), Mr. H. F. Glass (Local Manager), Mr. M. Ingham (Sports Guild Secretary), and Mr. W. C. Sweatman (Club Hon. Secretary).

Mr. Rudling (Club Chairman) thanked the visitors for their presence, while Mr. H. G. Everett, on behalf of the Club, thanked all ladies who had worked so hard to make the party an outstanding success.

35 Years with the Company.

The staff and employees at the St. Mary Cray Gas-Works of the South Suburban Gas Company made a farewell presentation to Mr. George H. Lovelock on his retirement at the beginning of the year after 35 years' service.

Mr. J. Rudling (Works Manager) made the presentation—a multi-chime dining-room clock—in the clubroom at the works. He was accompanied by Mr. W. C. Sweatman, of the Coke Sales Department, and the attendance included a large number of Mr. Lovelock's friends.

A.R.P. Notes

Expanded Metal for Permanent Concrete Trench Lining.

The purpose of a pamphlet recently published by the Expanded Metal Company, Ltd., Burwood House, Caxton Street, Westminster, S.W.1, is to describe and illustrate concisely a method of constructing *in situ* a reinforced concrete lining for trenches to provide protection against blast and splinters during air raids. The essential properties of such linings are strength, elasticity, and durability, and the materials used should be capable of being rendered proof against gas and water. This Company's system of trench lining, which has been approved by the Home Office A.R.P. Department consists of "Ribmet" for use as combined permanent centering and reinforcement for the concrete walls and roof with additional bar reinforcement in the roof to take up the negative stresses induced by its shape, which is claimed to be unique. The "Ribmet" is composed of ½ in. mesh "Expamet" expanded steel, and V-shaped ribs attached to it, with wire clips or ties, in the direction of the longway of the mesh of the expanded sheet. The meshwork is small enough to retain the concrete placed against it, and it forms a "key" for the inside coating; the whole outside face of the "Ribmet" should be given ½ in. of sand and cement rendering as a minimum protective coat. The concrete should be mixed a little on the dry side, and, after the concrete has set, the embedded "Ribmet" acts as an efficient reinforcement.

A "Ribmet" unit consists of two sheets for the walls and roof slopes and a crown sheet, the ends of which are to be overlapped on and wired to the wall sheets. The standard units are 3 ft. 1½ in. wide and should be overlapped 1½ in., leaving a net width of 3 ft., but making-up units can be supplied to suit any length of trench.

Among the advantages claimed for "Ribmet" units are the ease and speed with which they can be handled and assembled correctly in position; these are points that affect considerably construction costs and place "Ribmet" so favourable among lining reinforcements.

Association of Statutory Inspectors of Gas Meters

Annual Conference, 1939

At the invitation of the Mayor and Corporation of Salford, the 20th Annual Conference of the Association of Statutory Inspectors of Gas Meters will be held in that City on April 26 and 27 next.

The Annual General Meeting will be held in the Council Chamber at the Town Hall, on Wednesday, April 26, and the Chair will be taken by the President, Mr. Arthur Davies, J.P., at 10 a.m., when the Annual Report of the Council and other business will be dealt with. The Mayor and Members of the Corporation will receive delegates in the Mayor's Parlour at 12.30 p.m. where they will be entertained at lunch, and will afterwards be conveyed to the Corporation Transport Department at Frederick Road, where a tour of inspection of the various workings of the Department will be made.

On Thursday, April 27, delegates will assemble in the Council Chamber at 10 a.m., when a Paper will be presented by Mr. R. J. Trump, O.B.E., Controller of the Standards Department of the Board of Trade. By kind invitation of the Chairman and Directors of Messrs. Parkinson & Cowan (Gas Meters), Ltd., delegates will be entertained to lunch at the Salisbury Hotel, after which a visit will be paid to the Stretford Works of the Company where opportunity will be afforded to examine the latest processes of manufacture. The Council of the Association invites the attendance of representatives of Authorities administering the Gas Measures Acts, together with their inspectors.

Metropolitan and Suburban Companies' Results in 1938

A comparative statement of working results and revenue account costs per therm sold.

Compiled by E. COWEE, Accountant to the Commercial Gas Company

	Gas Light	So. Metrop.	Commercial	S. Suburban	Wandsworth	Tottenham	Croydon	Lea Bridge	Hornsey
Declared Calorific Value ... ... (B.Th.U.)	500	560	500	560 & 545	500	500	500	500	500
Gas Sold on Dec. Cal. Val. (before correction) (therms)	260,921,700	74,343,511*c*	14,783,390	26,003,189	31,299,702	23,974,240	16,478,118	5,186,285	3,871,592
Increase on Gas charged to consumers ... (per cent.)	*Dec.* 1·28 *a*	*Dec.* 3·86 *a*	*Dec.* 6·22	*Dec.* 1·30	*Dec.* ·33	·80	*Dec.* 1·04	*Dec.* 6·11	*Dec.* 5·61
Gas made per ton Coal on Works Tests (therms)	75·71	75·26	73·78	73·92	75·62	75·80	76·79	82·36	68·70
,, unaccounted for ... ... (per cent.)	3·96	·20	3·59	5·71	5·25	5·82	6·70	5·24	4·67
Coke made for Sale per ton Coal ... ...(cwts.)	10·17	9·57	9·65	10·22	8·73	9·16	10·01	9·76	10·85
Tar made per ton Coal ... ...(galls.)	10·55	10·79	10·05	9·88	10·15	12·03	12·73	17·44	10·28
Liquor made per ton Coal ... (galls.—8 oz.)	34·99	40·44	36·63	32·12	28·13	22·64	46.08	38·37	31·75
Percentage of Coke used as Fuel	19·12	19·31	25·73	22·68	26·02	24·52	18·70	24·67	16·55
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CAPITAL EXPENDED (less nominal additions) per therm sold	2 1·44	1 11·90*d*	2 3·65	2 8·79	2 9·41	2 1·06*f*	2 4·34	1 . 11·70	2 1·92
CAPITAL EMPLOYED per therm sold	3 7·50	2 11·85*d*	4 1·87	3 3·23	3 10·93	2 4·99*f*	2 10·03	2 4·57	2 11·66
	d. d.	d. d.	d. d.	d. d.	d. d.	d. d.	d. d.	d. d.	d. d.
Price of gas per therm in principal area ... ... { L'day, Mid. ...	8·7 & 9 9	9·4 9·4	9·7 9·7	9·9 9·9	8·2 8·2	8·6 8·6	9·1 9·1	8·4 & 9 9	8 & 8·6 8·6
Michs, Xmas ...	9 9	9·4 9·4	9·7 9·7	9·9 9·9	8·2 8·2	8·6 8·6 & 9·6	9·1 9·1	9 9	8·6 8·6
COSTS PER THERM SOLD.									
Revenue Accounts.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Coals, Oil, etc.	3·64	3·54	3·97	4·33	3·90	4·14	4·32	4·05	5·26
Less Residuals :—Coke and Breeze	2·23	2·07	2·35	2·43	2·19	2·09	2·37	1·98	2·94
Tar	·43	·35	·54	·33	·42	·66	·60	·50	·65
Amm. Liq. and S. of Amm.	·01	·08	·10	—	Dr. ·00	·08	·06	·02	·04
TOTAL RESIDUALS ...	2·67	2·50	2·99	2·76	2·61	2·83	3·03	2·50	3·63
Net for Coals, Oil, etc. ...	·97	1·04	·96	1·57	1·29	1·31	1·29	1·55	1·63
MANUFACTURE—									
Salaries	·13	·26	·23	·18	·18	·22	·19	·10	·17
Wages—Carbonizing	·32	·50	·60	·44	·45	·40	·29	·42	·46
Purification	·05	·16	·11	·10	·09	·13	·04	·03	·08
Repairs : Plant	1·19	1·52	1·40	1·21	1·70	1·70	1·08	1·70	1·05
Net Manufacture ...	2·66	3·48	3·32	3·50	3·71	3·76	2·89	3·80	3·39
DISTRIBUTION—									
Wages and Salaries	·84	·50	·50	·89	·48	·48	·63	·18	·37
Repairs—Mains and Services, etc.	1·12	·68	·54	·95	·63	1·60	1·17	·48	·46
,, Meters and Prep. Meters and Fittings	·48	·84	·78	·97	1·18	·47	·47	·60	·64
,, Stoves—Ordinary and Prep.	1·23	·97	1·23	1·31	·60	·38	·73	1·33	·39
TOTAL.—Net Manufacture and Distribution ...	6·33	6·47	6·37	7·62	6·60	6·69	5·89	6·39	5·25
Rents, Rates and Taxes	·57	·39	·39	·51	·32	·46	·81	·60	·34
MANAGEMENT—									
Directors, Auditors, and Salaries (Secretary, etc.)	·11	·19	·19	·20	·19	·15	·21	·24	·40
Collectors	·20	·18	·27	·14	·13	·20	·29	·16	·09
Stationery and General Charges	·17	·23	·27	·19	·25	·22	·32	·34	·27
Copartnership	·12	·11	—	·14	·21	·20	·23	·17	·16
Bad Debts	·02	·02	·01	·05	·04	·01	·00	·04	·03
Law and Parliamentary Charges	·00	·00	·00	·01	·01	·00	·03	·00	·00
Superannuations, Pension Funds, etc.	·25	·18	·34	·35	·26	·22	·44	·29	·54
National Insurance	·08	·30 *e*	·08	·07	·08	·09	·05	·07	·07
Sundries	·01	·00	·00	—	·01	—	·00	—	—
TOTAL EXPENDITURE (*less* Residuals)	7·86 *b*	8·07	7·92	9·28	8·10	8·24	8·27	8·30	7·15
Gas (less Public Lighting Expenses)	7·97	8·43	8·41	9·40	8·76	7·93	8·77	8·19	8·05
Rentals—Meter and Prep. Meter and Fittings...	·82	·69	·53	·89	·99	·56	·84	·50	·60
Stove	·90	·74	·89	·96	·61	1·07	·71	1·05	·27
Miscellaneous	·07	·02	·05	·02	·03	·03	·37	·02	·05
TOTAL—Gas, Rentals, etc.	9·76	9·88	9·88	11·27	10·39	9·59	10·39	9·76	8·97
Balance being Profit	1·90	1·81	1·96	1·99	2·29	1·35	2·12	1·46	1·82
Dividend and Interest	1·94	1·80	2·21	1·94	2·25	1·46	1·94	1·69	1·72
Surplus or Deficit	*Def.* ·04	·01	*Def.* ·25	·05	·04	*Def.* ·11	·18	*Def.* ·23	·10
Contributions to Funds and Sundry Payments ...	·00	—	·00	—	·06	·05	·17	*Cr.* ·05	·16
Sundries.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	21 10·89	21 0·85	22 3·05	24 7·83	22 1·92	24 10·82	26 8·15	26 5·56	28 8·29
Coke realised per ton Coal	13 4·66	12 2·28	12 9·52	15 3·54	12 1·56	13 0·00	14 10·82	—	16 9·47
Coke ,, ,, Coke	26 3·89	26 3·48	26 10·57	29 11·14	27 9·40	27 10·82	29 9·32	} 29 3·26 {	30 11·42
Breeze ,, per ton	8 9·23	1 4·89	6 3·20	5 2·33	8 5·94	5 10·71	7 3·53		—
Tar ,, per gall.	3·10	2·29	3·61	2·63	2·88	4·25	3·62	2·56	4·35
Amm. Liquor, etc., realised per butt (8 oz.)	1·66	1 4·42	1 7·30	—	Dr. ·06	2 6·52	10·63	4·58	10·00
Percentage of Stoves at Rental to Consumers ...	75	96	101	66	56	50	46	46	16
Bad Debts per cent. on Total Receipts	·13	·16	·10	·36	·29	·05	·03	·37	·24
Net Profit per cent. on Ordinary Capital	5·56	5·55	4·13	6·36	7·39	5·72	8·67	6·40	8·39
One-fifth Penny variation on Gas charged to consumers equals Gross	£205,083	£61,953	£12,319	£21,349	£24,819	£19,979	£13,116	£4,322	£3,069
Water Gas per cent. on Total Make of cubic feet ...	10·68	—	·41	—	8·96	20·46	14·02	15·44	14·44

a—Excluding gas sold in bulk. *b*—Excluding Leigh loans repaid. *c*—Including Sales to South Suburban. *d*—Eliminating purchase of South Suburban and Commercial Stocks. *e*—Including Co-Partnership Insurance Fund. *f*—Including investments in other Gas Companies.

"Gas Sold on Declared Calorific Value" is before correction for temperature and pressure, and the costs per therm sold are worked out on this figure. In previous years the "Gas Sold" was after correction. The Gas Light costs under the headings of "Distribution and Management" are not calculated on the figures shown in the published Accounts but are on the same basis as previous years and will agree with those appearing in "Field's Analysis."

"The Production and Utilization of Coke"*

Reviewed by Harold C. Smith, M.Inst.C.E.

Dr. Taylor has provided in his book a striking illustration of the advance which has taken place in the technique of coke production and utilization during the past twenty years.

In dealing with both production and utilization in one volume, his "Gas Industry" readers may feel that he has set himself too ambitious a task, but Dr. Taylor in his first chapter says "this growing demand for smokeless fuel justified the production of a book which will give to architects, estate managers, county and borough surveyors, heating engineers, and works superintendents the information necessary to enable them to choose and install designs of grates, furnaces and boilers, which will allow the utilization of processed smokeless fuel in the most economical manner." In studying the book (and it is a book to study and refer to and not just read and cast aside) one must bear in mind for whom it was written.

The book, however, will appeal not only to the limited field for which the paragraph quoted suggests it was written, but also to everyone engaged in the control of coke production and utilization.

The chapters dealing with "the Production of Coke," "the Properties of Coke," and "the Preparation of Coke" contain several statements which are either summarized or deduced from many publications to which reference is made. Unless these publications are read, in some cases the reader may arrive at a misleading conclusion. For instance, it is said that "by using coke breeze as a blending agent, the coke produced is normally better than ordinary gas coke and the gas yield from the coal is increased." Also, that "the addition of fusain to a coking coal has good results." The reader may be tempted to ask why is it not then common practice to blend coke breeze with coal before carbonization, and why do we not add fusain to obtain better results? Such statements need qualification before the coke producer applies them, and are not of much value to the class of reader for whom the book was written.

Several references are made throughout the book to the Critical Air Blast test as a measure of the combustibility of a fuel. This test has been shown to have considerable value when comparing several cokes of similar bulk density and having similar characteristics. It is essential that the tests be made and the results considered by a skilled operator. So many references are made to the C.A.B. test, and it is of such importance, that it would have been helpful to those not too familiar with it if a separate section had been devoted to its detailed consideration. As it is the references to it are so scattered as to make appreciation of its meaning difficult. For instance, on p. 31 a C.A.B. value for a typical coke is given as 0·05 cu.ft. per minute. On p. 160, in an open grate "a coke of a C.A.B. value of 0·04 cu.ft. per minute requires 4 to 7 cu.ft. of gas for ignition and one of 0·055 requires 12 to 15 cu.ft." On p. 23 "continuous vertical retorts may vary from 33 to over 100 in. in major axis. Samples from varying sizes of retorts, while having the same Critical Air Blast as measured in the standard test, have shown in open fire tests a marked difference in performance in favour of the narrow retort."

The importance of careful cooling and grading is rightly stressed and the author makes a brief reference to washing and dry cleaning. No importance seems to be attached to the cleaning of coal before it leaves the colliery. If this were done properly there would be no need to clean coke by either a wet or a dry process. Preliminary scalping, cutting, grading, and debreezing before loading would be sufficient.

The reader may be confused by the statements that "it is advisable to handle coke fairly roughly in the grading stages and thereby work out any incipient fractures before delivery to the consumer. Care is necessary in grading the coke into the smaller sizes and in filling the storage bunkers. Coke is not dropped but guided into place by chutes set at the least angle that will ensure free delivery," and he will probably be surprised to learn that "the filling of hoppers is now generally carried out by spiral and zig-zag chutes designed to equalize the distribution and prevent segregation"—a practice which is rather the exception than the rule.

The chapter dealing with the "Gasification of Coke" is mainly of value in referring the reader to detailed papers and reports which must be read (as the author undoubtedly intends) if full advantage is to be taken of it. It does, however, in itself provide a useful summary of the various methods of manufacturing gas from coke. The statement that "a few small plants are still hand-operated but the use of hydraulic power is now almost universal" is hardly correct.

Under "Boiler Fuels" the statement is made that "gas is supplied normally at calorific values ranging from 450 B.Th.U. per cu.ft. to 500 B.Th.U. per cu.ft. Town gas is made from the carbonization of coal to which is added a small quantity of water gas generated from coke." The second part of this statement is far too general and might well have been omitted.

The chapters dealing with "Combustion of Coke," "Coke for Central Heating," "Coke for Steam Raising," "the Open Coke Grate," and "the Domestic Coke Boiler" are full of information and interest, particularly to those who may have charge of appliances in which solid fuel is used or who may be called upon to advise on their installation or working. The value of these chapters is greatly increased by a number of excellent diagrams, tables, and illustrations, which add considerably to the theoretical and practical information given in the text. This section of the book is much too comprehensive to deal with in any detail in a review and must be read to be appreciated. The most up-to-date appliances are described, as are automatic controls for coke heating systems. The necessity for the employment of specialists in the installation and maintenance of these controls is mentioned. This necessity is so vital that it might well be stressed to a greater degree.

Brief descriptions are given of some of the more unusual uses of coke which have been developed in recent years, such as grass drying, orchard heating, and soil warming.

The book should prove of great value to the architects, estate managers, surveyors, and heating engineers for whom it has been written, and will be welcomed by all those who are endeavouring to focus on coke, as a carefully prepared smokeless fuel, the attention it deserves.

It represents a vast amount of work on the part of the author, and he is to be congratulated on the result he has achieved.

A word of praise is due to the publishers and the printers for the general excellence of the production.

* "The Production and Utilization of Coke," by F. M. H. Taylor, Ph.D., B.Sc. Published by Walter King, Ltd., 11, Bolt Court, Fleet Street, E.C.4; price 21s., postage 6d. extra.

Low-Temperature Carbonization*

Dr. Thau is, perhaps, better known in English gas circles than is any other German writer on technical matters, and the products of his pen can always be confidently expected to contain the very latest information on the subject at issue. His book on the low-temperature carbonization of brown coal and bituminous coal has been a standard work of reference from the time of its appearance in 1927 since it contained a description of almost every form of process then known. Even now, it still has an historical interest.

The present volume is to be regarded, in a sense, as a supplement to the earlier publication, for it describes a number of processes which were in their infancy when the original treatise appeared. Unfortunately, these processes were, in most cases, doomed to a speedy death. On the other hand, many new processes have been developed in the interim, and the main object of the new volume is to provide a description of their salient features and potentialities. The failures of the past have provided many useful object lessons as to what should be avoided in the design of low-temperature carbonization plant, and some of the modern forms of plant now described should be more likely to attain success than was the case with most of the earlier systems. A fresh topic for discussion in the present work is the rise of the newer form of process involving the carbonization of mixtures of coal and oil. Fantastic claims have often been made in respect of such processes, which were regarded as combining the advantages derivable from each of the components of the mixture, whereas, in actual fact, the processes suffered from the defect that worse results were obtained than would have been the case if each raw material had been handled in a separate plant of suitable design. Further themes treated in the new volume are the genesis or recrudescence of medium-temperature carbonization and carbonization by means of electrical heating.

Among the many forms of plant described, some are of the static type, others are continuous; some are internally heated, others are

* Kohlenschwelung. Zugleich Ergänzungsband zu "Die Schwelung von Braun- und Steinkohle. By A. Thau. (Halle (Saale), 1938, Wilhelm Knapp. Pp. viii. + 205; 251 illustrations and two portraits. Price RM. 19·50 bound, RM. 17·50 unbound).

externally heated; some work under atmospheric pressure, others under high pressure; some rely on small units, others effect carbonization in bulk. Few processes have been overlooked and the information given is as complete as published accounts permit. Each chapter is provided with an extensive bibliography. Further features are chapters on by-product plant and processes and on low-temperature assay apparatus.

Dr. Thau's book may be warmly recommended to all who are interested in the subject of low-temperature carbonization.

Gas Lighting*

A pocket book on gas lighting by the German Association of Gas and Water Engineers is devoted primarily to street lighting; and the lighting of houses, offices, and factories is touched upon but briefly.

Approximately one-third of the contents is devoted to fundamental matters such as the nature of light, the laws of radiation, the definition of terms and units employed in connexion with illumination, lighting specifications, polar curves, and lux meters.

The individual components of gas lamps are then discussed with special reference to mantles, burners, and lanterns and their accessories such as reflectors, governors, standards, suspensions, &c. Lighting and extinction are next referred to and brief consideration is given to the question of the adjustment of burners.

Special systems of illumination including floodlighting and other forms of ornamental lighting as well as the use of gas for traffic signals and signposts are discussed in a section which contains some striking photographs illustrating the effects which are obtainable.

Finally, methods for the improvement of street lighting installations and pitfalls to be avoided in the planning of lighting systems receive attention.

The book provides much useful information in small compass and is provided with nearly one hundred photographs and diagrams. A reproduction of a very fine plaque of Welsbach forms a very appropriate frontispiece to this essentially practical volume which has been specially prepared to meet the needs of gas engineers.

* Gasbeleuchtung. Taschenbuch für Gasingenieure. Herausgegeben vom Deutschen Verein von Gas- und Wasserfachmännern e.V., Berlin. (Munich and Berlin, 1937, R. Oldenbourg. Pp. 93. Price RM. 4·50 bound.)

Gas Installations*

A new edition of the specifications of the German Association of Gas and Water Engineers for the installation of low-pressure gas equipment and appliances in premises has now made its appearance, and supersedes the original specifications issued in 1934. The specifications evidently filled a definite gap since no less than 32,0000 copies of the first edition were sold.

Two view-points were kept in mind in the revision of the specifications now issued under the designation DVGW—TVR Gas, 1938. First, it was the aim that the regulations should be so drawn up that they should not hinder technical progress—for example, the use of substitute materials. Secondly, it was intended that the specifications should be such that they would be applicable to work executed both by the gas undertakings themselves and by outside contractors, without differentiation. Another publication deals with the necessary co-ordination between these two interests.

The specifications are divided into four sections devoted, respectively, to gas services, the connexion, installation, and adjustment of appliances, the evacuation system and tests for tightness. A supplement deals with liquid propane and butane installations.

The rules are very comprehensive and cover all the necessary general precautions and measures. Individual consideration is given to each type of appliance in so far as particular features such as location, supports, insulation, or ventilation require special attention. The characteristics of the various materials available for the construction of flue systems and their limitations and advantages are tabulated. Each material is allocated to its proper use. Particulars are also given of the cross-sectional flue area required in relation to the rated gas consumption of an appliance.

In the past, small undertakings with their limited experience have been at a disadvantage relative to large ones in their endeavour to give perfect service to consumers. Rules and regulations such as those now in question help to remove this disparity, since the accumulated experience of the whole industry is rendered available to all.

* Technische Vorschriftungen und Richtlinien für die Einrichtung von Niederdruckgasanlagen in Gebäuden und Grundstücken. DVGW-TVR Gas 1938. (Munich and Berlin, 1938, R. Oldenbourg. Pp. 54. Price RM. 1·20 unbound, RM 1·80 bound.)

Large Scale Policy in the German Gas Industry*

Dr. Segelken presents a masterly survey of past and present conditions in the German Gas Industry and of the developments which have taken place in the direction of the elimination of many of the smaller undertakings, the extension of the grid supplies, and the grouped production of gas. Attention is devoted particularly to the economic aspects of gas production and distribution and analogies are drawn between the problems of the gas and the electrical industries. The relative growths of the gas and coke industries, the development of large carbonizing units, the industrialization of the country, the extension in the use of gas, and a host of other factors receive consideration, including the question of the cost of gas production and transmission, the load factor, labour and capital costs, and the effects of past amortization on gas production costs. Finally, the problem of coke stocks and their effect on gas production policy is discussed.

Though the book is concerned solely with German conditions it should prove worthy of study in England also, for the Gas Industries of the two countries have many problems in common, particularly where rationalization is concerned. English readers will find much of interest in the method of approach used by the Author in the development of his theme.

* Grossraumwirtschaft in der deutschen Gasversorgung. By L. Segelken. (Munich and Berlin, 1937, R Oldenbourg. Pp. 147. Price RM. 9 unbound.)

Municipal Year Book, 1939*

The 1939 edition of this work is the largest since the volume was founded in 1897. It comprises 1,754 pages, 42 more than last year, embraced in 55 sections covering all the more important branches of the civic administration, as compared with 50 in the 1938 edition. Forty-six sections are devoted to the different phases of the administration, and nine sections comprise the descriptive records of National and Local Authorities, and names and addresses of Members of Councils and Chief Officers in England, Wales, Scotland, and Eire; and also lists of Joint Authorities.

The increase in the number of sections this year results from a re-arrangement of the classification and the addition of four new sections. Roads and transport have been arranged in separate sections. Housing and slum clearance have been combined. The new sections are: Local Government Service including decisions of the Minister of Health under the Local Government Superannuation (Administration) Regulations, 1938; the Air Raid Precautions Service, in which are included financial statistics which have never been gathered before; the administration of the Food and Drugs Law; and a section relating to the status of Municipal Boroughs. Many of the statistical tables have been substantially extended, thus making them of greater utility to the administration for comparative and other purposes.

Attention may be called to the comprehensive review of Local Government in 1938; the survey of recent legislation; the digest of Leading Cases affecting Local Government; the reviews of roads, finance, electricity, gas, housing, public health, education, libraries, parks, public assistance, sewage disposal, public cleansing, water supply, fire brigade, baths, industrial development, and other services, in which are included all the salient data relating to latest developments and also comprehensive statistics.

Mr. Walter Elliot, Minister of Health, contributes a general preface to the volume which he describes as "an indispensable companion to everyone interested in Local Government." He traces briefly developments in the administration during the last 50 years, and says: "This fine record of progress is a tribute to the efficiency of our system of Local Government. . . . The progress and expansion in the services provided by Local Government during the past fifty years, and the efficiency with which those services are run, should serve to show what a democratic system can achieve without the standardization of a too centralized system of government."

Mr. Leslie Burgin, Minister of Transport, writes a Foreword to the Roads and Transport Sections.

* The Municipal Year Book and Encyclopædia of Local Government Administration. Published by the Municipal Journal, Ltd., 3 4, Clement's Inn, Strand, W.C. 2; 35s. net.

Cornish Gas Association

At the Annual Meeting held at Truro on Feb. 22 Mr. F. R. G. Grant, Engineer and Manager to the St. Ives Corporation Gas Department, was re-elected President for a further term, and Mr. F. G. Kingwell, of Falmouth, was re-elected Hon Secretary.

Further News and Views

Examples of Standcraft and Items of Interest at London and Birmingham Sections.

Official Visits of the Junior Gas Associations and Salesmen's Circles.

The London Section

In the Chemical Section of the Fair at Olympia there are interesting displays by the Gas Light and Coke Company and the South Metropolitan Gas Company—and considering the nature of the exhibits, which hardly lend themselves to brilliant display-craft, two very attractive stands have been arranged.

The Gas Light and Coke Company's exhibit consists of about forty specimens of their range of tar, ammonia, and cyanogen products. Chief among these are creosote for wood preservation and hydrogenation purposes, pitch for briquetting and various manufacturing purposes, tars for all forms of road work, including surface spraying, tar macadam manufacture, and the preparation of thin tar carpets. "Brotox"—non-toxic tar for use in the vicinity of fishing streams—and "Becmulse"—a tar

Stott Appliances for Hotel, Restaurant, and General Catering Purposes.

emulsion for cold use—are also featured, together with anti-corrosive tar paint for the treatment of steelwork and ships' bottoms.

Tar spirits shown include benzoles, toluoles, solvent naphthas, xyloles, and heavy naphtha. A special grade of naphtha for disinfection purposes is included. Crystal phenol for use in the synthetic resin industry and cresylic acids are of particular interest. The cresylics are of 99½% purity, and of excellent colour keeping qualities. High iortho and high meta grades are shown. Naphthalenes range from drained, whizzed, and pressed crudes, to purified crystal powder, ball, and flake forms. Pyridines cover 90/180, 90/160, and 90/140 grades, and pure qualities of narrow boiling ranges. Ammonia products include sulphate of ammonia, the well-known fertilizer, and liquid ammonia for industrial purposes.

Colour is lent to the exhibit by the display of cyanogen products, including prussiate of potash and a range of bronze blues. Among other products are sulphuric acid and green copperas, produced by the Company, and employed in their own processes.

There are, in addition, a series of models showing various applications of the Company's products: A section of railway track with the Coronation Scot emerging from a tunnel, exemplifying the use of creosote for sleepers and telegraph poles; a continental railway engine being loaded up with fuel briquettes of compressed pitch and coal dust; a section of road demonstrating the laying of tar surface by means of a G.L.C. tank-spraying wagon; and finally an extremely "Arctic" scene indicating the waterproofing of tents with liquid ammonia.

from the

British Industries Fair

The South Metropolitan Gas Company's Products Department is represented by a display of "Metro" coal tar and ammonia products which serve the needs of many very different industries. The modern gas lighting in and around the "Metro" exhibit helps to draw attention to the display of products.

The first product which comes to hand, "Metro" road tar, is one to which a considerable amount of research has been devoted by the manufacturers for some years. Experimental work both in the Company's laboratories and on the roads is progressive and continuous, and it is now possible to supply suitable grades of tar to meet all local conditions where it is to be used, including that so necessary for summer treatment of main roads.

Other "Metro" chemical products include crystalline dry neutral sulphate of ammonia. "Metro" sulphate of ammonia can be stored for long periods without changing its excellent condition or affecting the sacks in which it is held. And its content of as much as 25·71% ammonia—equal to 21·14% nitrogen—is a further recommendation when concentrated fertilization is taken into account. "Metro" disinfectant fluid for general purposes (now having an increased coefficient of 11 at no increase in price); black varnish and "Metrotect" for protective treatment of outdoor ironwork; "Metro" creosote for preserving outdoor woodwork—either by direct application in the cold state or by impregnation under heat and pressure; solid smokeless fuels for domestic fireplaces and hot-water installations; motor benzole; anthracene; sharp oil; pyridine; sulphuric acid; sulphate of iron; coal tar pitch, &c.

Joint Visit of Junior Associations

The joint visit of members of all the Junior Gas Associations was paid to the Birmingham Section of the British Industries Fair on Thursday, Feb. 23, when representatives of more than 150 gas undertakings from all parts of the Kingdom gathered at Castle Bromwich.

Once again the visitors were the recipients of the generous hospitality of the Birmingham Chamber of Commerce, by whom, under the Chairmanship of Mr. G. Philip Achurch, M.B.E. (Immediate Past-President of the Chamber of Commerce), they were

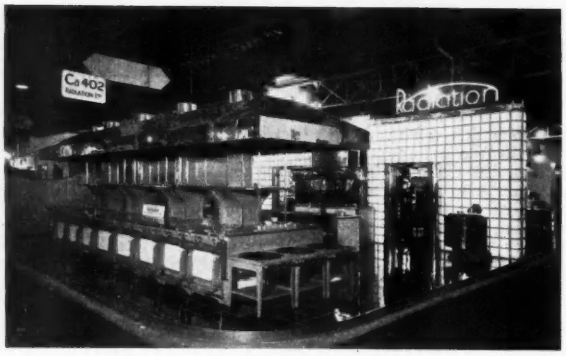
Thomas Glover & Co., Ltd., show Meters of varying Sizes and Capacities.

entertained at luncheon. Among those present was Mr. George Dixon, of Nottingham (Senior Vice-President of The Institution of Gas Engineers).

The Royal Toasts having been duly honoured, Mr. ACHURCH proposed "The Gas Industry." In doing so he extended a cordial welcome to the members of the Junior Gas Associations and

especially to Mr. Dixon. It was, he said, interesting to know that the British Industries Fair was the only rendezvous where the members of their eight or nine affiliated Associations had an opportunity of meeting together. Naturally the Fair Management Committee were appreciative of the fact that the attractions of the B.I.F. justified that gathering. Their Industry had every reason to be proud of the Gas Section, and a day was hardly sufficient in which to examine all the exhibits.

They were members of Junior Associations, went on the Chairman, and, as young men, they trusted, he imagined, that their future would be linked up with the Gas Industry. Such an attitude could, he was sure, be adopted with confidence. The Gas Industry had abundantly proved itself capable of adjustment to



The Radiation Stand.

Glass, stainless steel, and an intelligent use of artificial lighting have resulted in a stand remarkable for its individuality and freshness of outlook. At the same time, complete harmony with the exhibits has been happily achieved by the designer, Mr. Maurice Yates. The central walls have been built of hollow glass bricks, which are illuminated very effectively from within. The flyovers are worked in stainless steel and are surmounted by Neon signs. The floor is of blue glass, on the outside of which runs a skirting of steel, and the doorways leading from back to front of the stand are formed of pylons of the same metal. The modern note of steel and glass is carried to completeness in the corner seats and the tables, which are also constructed of glass and stainless steel.

the rapidly changing conditions of modern times. The uses to which gas was put to-day in homes and in industries could scarcely have been foreseen a generation ago; and the same might well be said of the methods of gas manufacture. There was little doubt that the future had in store changes equally as great, and that the tempo of change would tend to quicken. This would mean that younger men would be called upon, of necessity, to solve its problems in the time to come.

Meters, Governors, and Lighting Fittings are features of W. Parkinson & Co.'s Stand.

Heavy increases in the price of coal had made the past year difficult for the Industry, though he did not doubt that methods would be evolved to minimize the effects of such advances. Whatever the immediate future had in store, the ultimate development of the Gas Industry was assured, because the increasing use of gas as a fuel was a *logical* development. To-day everything they purchased for home or for factory was delivered in a state more prepared than hitherto. The housewife obtained her household requirements in neat cartons and tins; the woodwork for houses arrived ready planed and worked up, and so on. Then why, considering it was the heat in the coal they needed, should they have that heat dumped upon them in the form of a black mass of mineral—heavy to lift, difficult to break, dirty to handle, and resulting in smoke, ashes, and impurities? No; the logical way to deal with coal was to carbonize it and deliver its heat in a clean and easily controlled form.

Still Proud to be a Junior.

Mr. GEORGE DIXON, with whose name the toast was coupled, responded, and reminded his listeners that he was proud still to be a member of a Junior Gas Association. Youth was an indication of a state of mind and not a time of life, and if they looked round that room they would see that many members who could not be called juniors in terms of age had nevertheless retained their membership of Junior Gas Associations for that reason; and there was not one among them who was not proud to be a member of a Junior Gas Association.

He was there, continued Mr. Dixon, as a substitute for Mr. Robertson, President of The Institution of Gas Engineers, and therefore his first duty was to extend to them Mr. Robertson's apologies for his absence and his best wishes for a very successful day.

The Gas Industry was a peculiar industry inasmuch as they dealt with the utilization of coal, which was one of the country's greatest national assets; and they dealt not only with coal, but also with its by-products which, whether in peace time or war, were of vital necessity to the community. They were determined to see that such benefits as they could give were passed on to the

A Comprehensive Water Heating Display.

public in full measure. They were also proud to point to the tremendous amount of co-ordination and co-operation which existed between the supply and the appliance manufacturing sides of the Industry. The British Industries Fair was a very good example of the success of such relations between the two sides. They, too, were fully conscious of the fact that while great progress had been made, they had by no means reached finality. There was yet much research to be done in order to achieve still greater efficiency.

This visit by the Junior Associations provided the members with an opportunity to visit the Fair and see the very latest developments in all branches of the Industry; it was of great value to know what other people were doing, so that they could utilize those developments to the benefit of the undertakings they served.

They of the Junior Gas Associations and of the Gas Industry generally wished the Fair Management Committee every success in their venture as the Chairman had so kindly wished them every success in their Industry. They could not leave without expressing their sincere thanks to Mr. Achurch and the Birmingham Chamber of Commerce for their liberal hospitality, for the kind words Mr. Achurch had spoken, and for the wonderful knowledge he had shown of the Industry of which they were all so proud to belong. They acknowledged what he had said and thanked him very heartily for the way he had said it.

The remainder of the day was spent inspecting the exhibits.

Salesmen's Day

On Friday it was Salesmen's Day. Plenty of time was allowed for the inspection of exhibits, the only formal business of the day being the very palatable duty of having lunch as the guests of the Fair Management Committee and the Birmingham Chamber of Commerce.

The chair at luncheon was taken by Mr. G. NEVILLE SHERRYN, Chairman of the Fair Management Committee.

The Loyal Toast having been honoured, the CHAIRMAN went on to propose the toast of "The Gas Industry." Anyone, he began, could make gas, but it took a clever man to sell it, and the salesman to be successful had to study his customer and be able to read into the minds of the people with whom he was dealing. Salesmen should educate the buyer into what he should use and not necessarily to sell the buyer what he wanted. It was the salesmen, for example, who had educated the public to get rid of the black cooker. Competition had helped the Industry to make bigger strides than ever before in its history, and they certainly had not reached the limit of their possibilities. In this connexion he spoke of thermostatic control as giving gas a great advantage over competitive fuels. The reputation of the Industry never stood higher than it did to-day, and the salesmen should not be satisfied with selling "shoddy" appliances.

Mr. G. M. LEWIS (Controller of Gas Sales, Birmingham Gas Department) replied in the absence through indisposition of Mr. H. D. Madden, Executive Chairman of the B.C.G.A. Mr. Lewis began by reading a telegram from Mr. Madden, wishing the salesmen a successful gathering and expressing regret at his enforced absence. Nobody, Mr. Lewis then went on, deplored more than he did the fact that Mr. Madden was not with them that day. He then asked Mr. W. L. S. Spinks to wire Mr. Madden, expressing the wishes of the assembled salesmen for a speedy recovery. Thanking Mr. Sherryn for his kind references to the Industry, he asked him to convey their gratitude to the Birmingham Chamber of Commerce and the Fair Management Committee for the hospitality accorded them. They would also like to say how much they appreciated their efforts for the Gas Section, which this year was the best ever. They would also like to say how much they appreciated the efforts of the exhibitors and their excellent work.

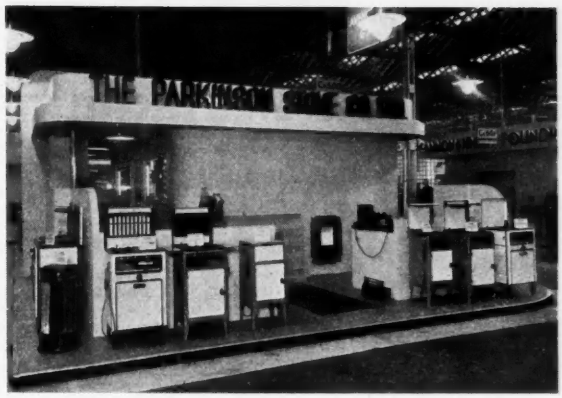
The Water Heating Section of R. & A. Main's Display.

Greater opportunities were generally possessed by salesmen to-day than ever before. He considered salesmanship was definitely coming more to the front in all industries, but especially in the Gas Industry, owing to the efforts of the B.C.G.A. The Gas Salesmanship Course was more thorough than ever before. A new course in varying grades, originating from the B.C.G.A., was to be offered to gas salesmen by The Institution of Gas Engineers during the coming winter. This would be well in front of anything that had been achieved in the Industry and certainly as good as anything that had been done in any other industry. He urged all to avail themselves wholeheartedly of the opportunities offered. He hoped the new course would not only make good sellers, but, what was more important, good buyers. The man they wanted was the one who would sell to the consumer what was really wanted and what could be represented on the credit side of an undertaking's balance-sheet as good will.

Visit of Women's Gas Council

About 200 members of the Midland branch of the Women's Gas Council visited the Fair at Castle Bromwich on Wednesday last at the invitation of the Fair Management Committee. Parties were conducted round the Gas Section and much interest was displayed in the various appliances for labour saving and convenience in the home.

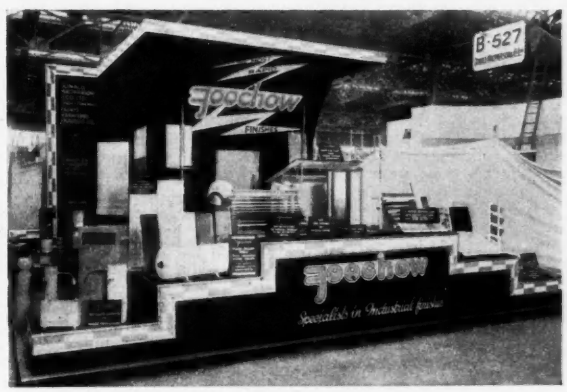
During the afternoon the visitors were entertained at tea, and among those present were the Lady Mayoress, Mrs. Crump, the Chairman of the Birmingham Gas Committee, Councillor A. S. Giles, and Mrs. Giles, the General Manager of the Gas Department, Mr. A. W. Smith, and Mrs. Smith, and Lady Humphries, Vice-President of the Council.



A Range of Cookers by the Parkinson Stove Company, Ltd., exemplifying their policy of Standardization.

Mr. Smith welcomed the Lady Mayoress and the visitors on behalf of the Fair Management Committee.

Councillor Giles in proposing a vote of thanks said the work of assisting the housewife in the hours of cooking was definitely of national importance. That work was being done all over the country by gas undertakings through the medium of demonstrators. It was very important work, but, apart from this, the demonstrators also gave advice to the members on the most suitable modern gas appliances for warming rooms, heating water, and for refrigeration. The last named was most important to ensure that food was kept good even in the warmest climates. All these factors contributed to healthier conditions in the home and thus furthered the national fitness campaign.



A Colourful Exhibit by Donald Macpherson & Co., Ltd.

A New Gas Circulator

A newcomer to the ranks of gas water heating appliances is a neat little circulator by J. & J. Braddock, shown for the first time on their stand at the Birmingham Section of the B.I.F. Styled the "Meteor," this apparatus has as perhaps its most outstanding feature simplicity in both construction and operation. The design of the heating unit is the outcome of experience and experiment, and the fact that the unit is cast in brass ensures long life, even

under heavy duty. The position of a circulator is largely dependant upon the existing hot water installation. The small dimensions together with the attractive finish of the "Meteor" enable it to be fitted either in bathroom or kitchen without interfering with any existing arrangements or colour schemes. The outside case and baffle are finished in white porcelain enamel giving a surface which is very easy to keep clean, while the brass fittings are chromium plated and do not tarnish or discolour.

Despite its compact size of 20½ in. high and 6½ in. diameter, the "Meteor," has an output of 10-11 gallons of hot water per hour raised 80°F. with a maximum gas consumption of 25 cu.ft. When the circulator has raised the temperature of the water in the storage cylinder to 140°F. the thermostat shuts off the gas completely leaving only the pilot jet alight. When hot water is drawn from the cylinder, cold water enters from the feed tank and eventually reaches the thermostat. The cooler water causes the thermostat to open the gas valve and the heating process is repeated. To give complete safety, the burner is fitted with a pilot operated safety valve which closes the gasway in the event of the pilot light being extinguished.

Alleged Maladministration at Southport

Engineer and Deputy Engineer Accused of Conspiracy

The hearing began on Wednesday, Feb. 22, at the Southport Police Court, of summonses against the Southport Corporation Gas Engineer, Mr. J. H. Clegg, and the Deputy Engineer, Mr. W. E. Plevin, alleging conspiracy with chemists at the gas-works in illegal practices in the administration of the Gas Undertaking.

The charges against Mr. Clegg and Mr. Plevin were given in the "JOURNAL" for Feb. 1, p. 288. Briefly stated, they were charged with having conspired, together with four chemists, to cause the Gas Examiner to make tests of gas which was not representative of the gas going out to the town; with conspiring to contravene and defeat the provisions of the Gas Undertakings Acts; and with conspiring to cause gas to be supplied to the town at less than the declared calorific value.

The case for the Director of Public Prosecutions was opened by Mr. Hartley Shawcross, K.C., who described at length the legal position relating to the supply of gas on a thermal basis, and also the provisions in regard to freedom of the gas from sulphuretted hydrogen. He explained that the declared calorific value of the gas supplied at Southport was 470 B.Th.U. He submitted that for a considerable period the gas actually supplied had a calorific value lower than that declared and was not kept free from sulphuretted hydrogen. The Prosecution sought to show that the responsible officials of the Southport Gas Undertaking allowed such gas to be regularly supplied to the town.

Counsel went on to describe the oxide purification process and the effect of admission of air to the purifier boxes on the calorific value of the gas sent out to the district. He also discussed the question of make of gas per ton of coal carbonized. "I suppose," he said, "that the success of a gas undertaking is often measured by the make per ton of coal, and it may be for that reason they exhibited no undue concern at the consistently low calorific value which was being supplied. In order to ensure that the statutory applications with regard to calorific value and freedom from contamination are carried out the statutes provide certain machinery. That machinery completely broke down in the case of this organization. In fairness to the defendants, the breakdown was not originally due to them. But when they came to occupy the responsible positions they chose to continue a state of affairs, the gravity of which, in the submission of the prosecution, they must have known, and which it was their duty as the responsible officials of the undertaking to remedy."

Mr. Shawcross then explained the duties of the Gas Examiner. In this case the Examiner appears to have been a person whose appreciation of his responsibilities did not particularly qualify him to fill the position which he occupied. His visits seem to have been well known in advance and the tests which he made at the Works seem to have been perfunctory in the extreme. In the result it was not difficult so to deceive the Examiner that the system of safeguards provided by the statutes was reduced to a complete farce.

Penalties.

Counsel next dealt with the penalties attached to supplying gas of a calorific value below that declared. The penalty with which they were concerned in this case was a cumulative one, and had it not been for the alleged criminal activities of the defendants and their subordinates the Southport Corporation would, during the period covered by the charges, Oct. 26, 1936, to Jan. 20, 1938, have been called upon to refund, in part to the Board of Trade and in part to the consumers of gas, several thousands of pounds.

Counsel went on to say that Mr. Clegg was appointed Gas Engineer at Southport in 1934, and Mr. Plevin Deputy Engineer in 1936. Plevin was in general charge of the Crowlands Works, subject to the control of Mr. Clegg, and with the full knowledge on the part of Mr. Clegg of what was being done by him and his subordinates. Also at Crowlands there were four chemists, Illingworth, Chief Chemist, Grainger, Howard, and Marchant. All these men had been in the service of the Corporation for a long time. Although only two out of these six people were charged, it was the case for the Prosecution that all these played their respective parts in a conspiracy to do various illegal acts. The Chemists were parties in a subordinate sense. They could not order Clegg or Plevin to stop the illegal practices, but on the other hand either Clegg or Plevin could have ordered them to stop them. The Prosecution submitted that both Plevin and Clegg chose to carry on the practices which operated more to their advantage than to the advantage of the four chemists, and it was the chemists who brought the situation to light by drawing the attention to the Town Clerk to what was going on.

As between Clegg and Plevin, Plevin did not appear always to have been a very happy party to what was occurring, and the Prosecution submitted that Clegg was primarily responsible for the continuance of the illegal practices, and adopted an attitude which the Bench might think, having heard the circumstances, was not without cunning. It was at all times in his power to put an end instantly to the illegalities, the existence of which he must have known full well, but as to the existence of which in point of fact, by deliberate falsification of figures and reports, he deceived his Committee, to whom he was responsible. The Prosecution had not hesitated to put him as the principal offender, in spite of certain success in causing others to carry the blame.

When Clegg and Plevin took over, continued Counsel, they no doubt inherited at Crowlands a very unsatisfactory state of affairs. The gas apparently was not being produced or supplied at the declared calorific value of 470 B.Th.U., but in the submission of the Prosecution they permitted and caused matters to go from bad to worse. In the quarter ended December, 1936, the first quarter with which Plevin was concerned, the records of the Works showed that the average calorific value of the gas supplied was only 459 B.Th.U. On one occasion it dropped as low as 440 B.Th.U. These figures ought to have shocked both Plevin and Clegg.

Mr. Shawcross, continuing, said that what happened when the alleged malpractices were discovered at the beginning of 1938 suggested that there would have been no real difficulty in raising the calorific value of the gas and remedying this state of affairs. When matters came to light the position was restored to a proper state in a few days. Again, if they could not have raised the calorific to 470 B.Th.U. the way was open for them to declare a reduction in the calorific value of the gas they were supplying.

Mr. Shawcross said that apparently prior to Clegg's appointment as Gas Engineer the practice had arisen of filling a special holder with gas when the Gas Examiner came to make his test, so that he tested not gas supplied to the town, but gas specially prepared for the purpose. It was not suggested that either Clegg or Plevin was responsible for the inception of that practice, but it was alleged that Plevin was initiated into the practice by one of the chemists. It was further alleged that Plevin adopted the practice and ordered it, and that Clegg was a willing party to this being done. The time of arrival of the Examiner seemed to have been conveniently known in advance. The Examiner's quarterly reports consistently showed the gas to be up to the declared calorific value. In the first quarter of 1937 the report by the Gas Examiner showed an average for the quarter of 472·6 B.Th.U., which was wholly false. The figures which the defendants had taken for their Works showed that the average calorific value supplied to the town was only 455 B.Th.U. In the submission of the Prosecution, Clegg was responsible for the state

of affairs. So well did he realize how low the calorific value was that in the monthly reports he had to make to his Gas Committee he faked the figures he was getting from his Works. He put before his Committee wholly false statements.

Purification Troubles.

In 1937 matters were going from bad to worse. Trouble was being experienced with the purification system and trouble with producing at the declared calorific value the increasing quantities of gas the town required. In June, 1937, a new Boys calorimeter was supplied. It was found that it could be set so as to read high, and Plevin, it was alleged, ordered one of the chemists to adjust the apparatus so that it would read something like 10-12 B.Th.U. higher than the real calorific value. Sulphuretted hydrogen was passed on to the town and on one occasion a test showed there were 110 grains of sulphur per 100 cu.ft. of gas. In the record books the chemists gave the gas as being free from sulphuretted hydrogen, but they put dots by the side of their entries indicating that the result of the test was that the gas was not free from sulphuretted hydrogen.

In January, 1938, it was known when the Gas Examiner would call at the Works. The holders at that time were contaminated with sulphuretted hydrogen, and if the examiner had tested them he could not have failed to discover it. Plevin, it was alleged, told one of the chemists to dismantle the apparatus for testing for sulphuretted hydrogen, and this was done. If the Gas Examiner had been a person of ordinary diligence, the dismantling of the apparatus would not have prevented him from making a rough test. Plevin apparently knew his man and knew that when the Examiner came along and saw the apparatus out of order he might lack the energy or initiative to make a test at all. The Examiner came on Jan. 11, and he did not make a test for sulphuretted hydrogen, but he gave a certificate that the gas was free from it, when it was in fact present in quantity.

Eventually the chemists did what was their clear duty, and reported the matter to the Town Clerk. There followed a lengthy enquiry. [The results of this were summarized in the "JOURNAL" for May 11, 1938.] At this stage in the proceedings Counsel said that Plevin chose to make a voluntary statement. This, Mr. Shawcross read:

Plevin's Statement.

"First of all I say this, at the private enquiry in February, 1938, I agreed to a suggestion that in order not to present the appearance of a general dog fight among the staff of the gas department, wherein the chemists would be shown to be attacking Clegg and myself, and I would be attacking the chemists and Clegg, and Clegg would be attacking me and the chemists, that I should more or less avoid attacking Clegg, on the advice of my solicitor.

"Acting on that advice, I avoided in my evidence in chief (a proof of which was sent to Mr. Clegg before the enquiry) attacking Mr. Clegg, who said he would dispute certain of my statements, and I omitted those parts from my evidence in chief which were of material importance to me.

"I was also advised that, as the gas examiners had not been mentioned directly in the chemists' allegations, I should avoid involving them in any way, and in giving my evidence the gas examiners were not cited at all. The effect of this course weakened my evidence on behalf of myself very considerably. Also due to the short time there was to prepare a defence to the multitudinous matters raised by the chemists, a number of points were overlooked and I had not the time to place all the evidence I could if I had had the time to look through all records and books.

"When Mr. Baucher's report was published I took what further steps I could to get a further hearing on the matter. I felt that certain portions of that report were not accurate, and that the inaccuracies were unfavourable to myself. Consequently, I approached several members of the Council with a view to getting the enquiry re-opened in public, and I sent a copy of the additional evidence, which I had prepared refuting the charges against me, to every member of the Council, to the Town Clerk, Mr. Clegg's solicitor, and Mr. Brighouse. The enquiry was not re-opened however.

Telephone Message.

"The material part of my statement of evidence in chief which was omitted by me referred to a telephone message I sent to Mr. Clegg in January, 1937, explaining the system of faking and deception which had existed. Mr. Clegg said he would dispute the receipt of that message from me, and I agreed not to give it in my evidence.

"During the course of that telephone message to Mr. Clegg I told him that the calorific value of the gas supplied during the previous month, December, 1936, was very low. This was before I sent the calorific book down to him. He then told me the calorific value should be kept between 460 and 465 B.Th.U. The responsibility for the low calorific value was, therefore, not mine in view of Mr. Clegg's instructions to me. I told him (Mr. Clegg) what efforts I had made to get a more accurate return of the calorific value of the gas from the chemists, the trouble with the purifiers through being kept short of air, that I had insisted on the air being increased, and that the whole business of calorific value was a farce, instancing the irregularity of this testing by the gas examiner, including the use of No. 1 specially prepared holder and the calorimeter for testing being inaccurate. I also told him that the gas examiner was always in a hurry and did not make efficient tests, and that we usually knew when the gas examiner was coming. I told Mr. Clegg that on looking back at the calorific value records we had never distributed gas at 470 B.Th.U. The chemists were responsible for the variations in calorific value, and the occasional presence of H_2S because they failed to carry out my instructions, and they had insufficient knowledge about their job.

"When Mr. Clegg demanded an explanation in writing, of the low calorific value for the month of December 1936, I wrote a minute on Mr. Clegg's memo asking Illingworth for an explanation. Illingworth replied in writing, and I redrafted his reply in my handwriting and sent it to Mr. Clegg so that he could explain the figures to the Gas Committee. He did not use the explanation but altered the figures and raised it in his return to the Committee, thus avoiding explanation to the Committee. I did not keep a copy of Illingworth's explanation, or a copy of the reply I sent to Mr. Clegg, who has since denied receiving my explanation.

Did Not Receive Reports.

"Mr. Illingworth should have a copy of his note, which was typewritten. At that time I did not receive copies of Mr. Clegg's monthly reports, but it has come to my knowledge that he made a practice of altering some of the figures supplied by the works when supplying his reports to the committee. The first time I had any knowledge what he told the committee was at the enquiry.

"Since the enquiry the chemists have followed my instructions, and there has been no difficulty in maintaining the quality of the gas. Had these instructions, which have always been similar, been carried out prior to the enquiry, the trouble in regard to purification would never have approached the proportion it did. The difficulties experienced regarding the public lighting were due to variations in calorific value because of the chemists' failure to adjust the plant properly, and to carry out my instructions.

"Had my instructions regarding the working of the retorts been properly carried out, many of the difficulties would not have arisen. Shortly after my appointment in October, 1936, I drew Mr. Clegg's attention to the unsatisfactory state of the purifying plant, and he said that he had it under consideration.

"Several times afterwards, I asked him about the new purifiers, but it was not until April or May, 1937, that the provision of new purifiers was agreed to by the Committee. It was not until October, 1938, that the new purifiers were put into operation, although I had repeatedly pressed Mr. Clegg and urged on him the necessity for new purifiers.

"In January, 1938, the chemists had got the works into an invidious position regarding purification.

"All the holders contained gas contaminated with H_2S, and Marchant came to me and said he was expecting the gas examiner that day or the day following, and asked what could be done about it.

"Marchant said that Brearley was bound to smell the gas in the testing room. After discussion with Marchant I told him to take the globe off the H_2S testing apparatus in the hope that the gas examiner would not make a test. Marchant took the globe off and I told him to take it to my office. After I had told Marchant to do this, I rang up Mr. Clegg on the telephone and told him we were expecting the gas examiner, and as I had for days been in touch with Mr. Clegg on the telephone he knew the exact position regarding H_2S. I also told Mr. Clegg that we had tried to avoid the gas examiner making a test by removing the globe from the testing apparatus. Mr. Clegg did not disapprove. Immediately after lunch Mr. Clegg came to the works and I went with him to the testing room. I told him we were in a mess with the gas examiner coming. He saw the globe was missing and he knew why we had taken it off. He said he did not think the subterfuge would be effective, and that Brearley would be bound to notice it. I had asked Marchant to light up the calorimeter in the testing room so that the examiner could make his test as quickly as possible.

"The examiner came, and after he had gone the form showing the result of his test was brought up to me by one of the chemists, and H_2S was marked as absent.

"I then rang up Mr. Clegg and I told him the examiner had been and reported that H_2S was absent. The globe was replaced a few days afterwards.

"Even after the chemists had been to the Town Clerk they still disobeyed my instructions to keep the air slots open on Jan. 29, 30, and 31, 1938, and I drew Mr. Clegg's attention to this and he gave Howard a very strict warning about it.

"Whenever H_2S was present or any other difficulties had arisen

in the manufacture of gas I spoke to Mr. Clegg on the telephone almost every day and acquainted him with the facts.

"With regard to the allegations made about my giving instructions for the Boys Calorimeter to be altered, I have made a full explanation of what took place regarding that calorimeter in the additional evidence I had prepared for the enquiry and I gave him a copy of that additional evidence. Before the introduction by Mr. Clegg of the Crowlands daily log sheets there was a book known as the foreman's carbonising book containing an analysis of the daily work done at Crowlands.

"This book contained frequent references to the preparation of a supply holder for testing, and the book contains some of Mr. Clegg's pencilled notes," the statement concluded.

Double Deception.

Mr. G. W. A. Illingworth, Chief Chemist, then gave evidence. He agreed with Mr. Shawcross that the Gas Examiner had been doubly deceived. He was deceived as to the gas he was testing and deceived by the instrument with which he was testing it.

Illingworth said that prior to the appointment of defendants, the gas supplied to the town had been deficient in calorific value. That fact appeared from day to day in the calorific value book and in the daily log sheets. After Clegg had been appointed, gas continued to be supplied to the town which was deficient in calorific value. As a usual thing, both Clegg and Plevin initialled the calorific log book monthly.

Mr. Shawcross: Why was it that the calorific value was always deficient in this way?—In my opinion, it was due to an attempt to make a higher make of gas per ton of coal.

Illingworth, proceeding, said there was a note in Clegg's handwriting in the calorific value book for December, 1936, calling for an explanation in writing from Plevin regarding a calorific value of 446 B.Th.U. He (witness) had no recollection of Plevin saying anything to him about it. He had no recollection that Clegg spoke to him about the low calorific value prior to December, 1937. He could not be more definite about it. Plevin had on occasions spoken to him about the low calorific value, but he could not give even approximate dates.

Plant Deficiencies.

Immediately prior to Plevin's appointment he himself had been acting as deputy gas engineer, and when Plevin took over he had a discussion with him about the works generally and the low calorific value of the gas in particular. He also explained to Plevin the deficiencies in the purifying plant. He told Plevin that the calorific value was in fact down, and further explained that a special holder had been used to get up the calorific value of the gas when the Gas Examiner came to carry out his official tests. Plevin did not give him (witness) any instructions to raise the calorific value, or as to how it should be raised, nor did he receive similar instructions from Clegg. Prior to December, 1937, he was never told to do anything either by Clegg or Plevin about the calorific value.

At the end of January, 1937, there was an entry in the calorific value book by Clegg to the effect that the calorific value was too bad. In November, 1937, there was another entry by Clegg to the same effect, but on neither of those occasions was witness given instructions as to how the calorific value might be raised.

Mr. Shawcross: Would it have been possible to raise it without altering the plant, or decreasing the make per ton?—In my opinion, it would not.

Illingworth said on a number of occasions both Clegg and Plevin spoke to him regarding the make per ton. He could only recollect that they both asked for it to be increased. Any increase in the make per ton would lead to a possible decrease in the calorific value.

The use of the special holder for the purposes of tests by the gas examiner continued after witness had informed Plevin of the practice. He did not recollect any instructions from Plevin about it, but he certainly did not tell him not to use it. About August, 1937, a new Boys calorimeter was taken into use, and the Hyde meter was set so that the test would read 10 B.Th.U. high.

Mr. Glynn Blackledge, Counsel for Mr. Clegg, said at this stage it should be made clear that his client was not charged with this particular matter.

Continuing, Illingworth said the Sigma recording calorimeter continued to be set from the new Boys calorimeter, so that up to December, 1937, all the records of the calorific value were about 10 B.Th.U. higher than was in fact the case.

Witness said that on a number of occasions in 1937 sulphuretted hydrogen went out in the gas supplied to the town. It started in August, 1937, as near as he could say. He told Plevin about it repeatedly, and his usual instruction was to increase the amount of air to the purifying boxes. On occasions Plevin told witness to what extent the air should be increased. In witness' opinion, on occasions this represented more than the normal supply of air. It was actually possible to carry out Plevin's instructions, but it would have disastrous effects because the calorific value would be lowered to a very great extent. Plevin did not tell him how the calorific value could be kept up in spite of the admission of this air to the purifiers.

Neither Plevin nor Clegg gave him instructions prior to December, 1937, to make alterations to the plant, or as to any specific steps to be taken to maintain calorific value. The chemists kept a record book of tests on H_2S.

In the first week of August, 1937, he spoke to Plevin about the presence of H_2S, and he (witness) agreed not to put into the purifier record book any record of the fact that any H_2S had passed through the last of the purifier boxes prior to passing into supply. In consequence of this arrangement, notwithstanding the fact that H_2S was passing into the town supply, the purifying book did not record the fact.

After H_2S had been passing to the town for a short time, witness adopted the system of placing a dot in the right hand margin of the record book on those occasions when H_2S was present in the town supply, although its existence was not recorded in the record. His system was followed by the other chemists, and continued till Dec. 1, 1937. He had many conversations with Plevin as to what might be done, and suggested himself that the purifier boxes should be changed more frequently. On many occasions Plevin gave no answer, and on other occasions he said the boxes had not passed sufficient gas and should not be foul. On Dec. 4, 1937, a note was addressed to the shift chemist from Plevin, to the effect that Mr. Clegg was "very concerned about the calorific value of the gas" in view of the very serious effect it was having on central street lighting in the town. The note went on to say that the calorific value should be kept at between 460 and 480 B.Th.U., and that Mr. Clegg would treat any serious variation with concern.

Within the next few days the other three chemists discussed the note with witness, and they told him all the irregularities had ceased. On Dec. 30, 1937, he saw Clegg in the laboratory office at Crowlands, where he was discussing some matter with Grainger. Witness had some conversation with Clegg on that occasion, and told him the difficulties they were having and showed him the purifier records book, explaining the incorrect entries and persistent dots. Witness told Clegg H_2S had been passing into supply, but Clegg made no comment on it, but said the records must in future be correct. He could not recollect that Clegg gave any instructions how the supply could be kept free of H_2S. On that day no H_2S was going to supply, but it started the following day.

Laundry's Complaint.

On Jan. 4, 1938, witness received an instruction from Plevin that a certain laundry had complained of the bad smell in the gas. He was told to go to the laundry and tell them it was caused by using stock coal of an inferior quality. Witness went to the laundry and found a strong smell of sulphur dioxide, which was the product of combustion of H_2S. He gave the explanation Plevin had told him to give.

Mr. Shawcross: Was that explanation true?

Witness: No, not entirely.

Did the use of the stock coal make any difference?—No.

Sulphuretted hydrogen continued to pass from Jan. 1 to 10 into the holders. Eventually witness and the other chemists decided to make a report to the Town Clerk of Southport, because witness felt the affairs that had been going on had been getting "too wild."

On Jan. 11, 1938, he was in Plevin's office and saw a glass globe from the H_2S testing apparatus. He saw it there for three or four days.

Mr. Robert Crichton, Counsel for Plevin, began his cross-examination.

Replying to him, Illingworth agreed he had no qualifications apart from practical experience at the works. He had applied for the position of deputy engineer, but Plevin was appointed, and when they first met witness told him some of the difficulties they had at Crowlands.

Mr. Crichton then summarized the work done by Plevin subsequent to his appointment. The coke grading plant had been completely overhauled, the weigh office had been re-constructed, and the general office moved into the old building. At the time Plevin went to the works, the storerooms were badly arranged, and they were re-arranged properly under his guidance.

Witness said that the latter work was "on the cards" before Plevin came, but no actual alterations had taken place before his arrival.

Mr. Crichton: I suggest that at the time Plevin came into the Crowland Works there was a spate of mechanical difficulties with the plant?—There certainly was.

Is it true to say that before he could get the gas-works working properly these mechanical difficulties had to be put right?—Perhaps, theoretically, yes; practically, no.

What I suggest is that before the gas-works could be trusted to work efficiently for the production of gas, there was a great deal of mechanical work to be put in?—Yes.

At this stage the hearing was adjourned until next Friday.

The Deterioration of Coal on Storage

By JAMES JAMIESON, M.Inst.Gas E.,
Engineer and Manager, City of Edinburgh Gas Department,
and
W. J. SKILLING, A.I.C.,
Officer in Charge, Fuel Research Coal Survey, Scotland.

[Extract from Communication No. 201 of The Institution of Gas Engineers, to be discussed at a Special General Meeting of the Institution on March 14.]

SUMMARY

Following upon the issue of a questionnaire to consumers of large quantities of coal on the effects of storage upon it, the Director of Fuel Research was informed that experimental work was proceeding at the Granton Gas Works of the Edinburgh Corporation Gas Department. The nature of these experiments was to ascertain the effect of storage on the gas making properties of the coals commonly used by the Gas Department in the course of normal production. After submitting the results of their work to the Fuel Research Organization of the Department of Scientific and Industrial Research, it was arranged that the Gas Department and the Fuel Research Station should co-operate in a further series of experiments which it was proposed should be carried out.

Twenty Scottish coals were selected and laid down systematically in heaps of about 8 tons, portions being removed at intervals of 15, 24, and 44 months for analysis and carbonization tests. In addition, seven of these coals were laid down in heaps of 200 tons and after a period of 44 months removed for carbonization in vertical gas retorts with steaming.

The analytical data obtained were largely in agreement with existing knowledge, as, for instance, the slow oxidation of the coal and the loss of caking properties. Calorific value has changed very slightly after the maximum storage period.

The principal features from the small-scale carbonization tests are little change in gas volume, but a tendency for the calorific value and the gaseous therms to decline. The yield of coke is practically constant throughout the series, but there is a decline in the size, particularly from the coals of low caking power.

Carbonization tests were carried out in continuous vertical retorts. Owing to variations in the amount of steam used, or the degree of conversion, some of the coals show increases in gaseous thermal yield after storage. The deterioration of the coal is, however, shown by the marked increase in the breeze content of the coke, particularly in the case of coals which had only a small reserve of caking power.

CARBONIZATION TESTS IN CONTINUOUS VERTICAL RETORTS

In order to determine the effect of weathering on coals stored in the open in large heaps, and in particular to determine how and to what extent the gas-making and coke-production properties were affected when carbonized in continuous vertical retorts, it was decided to stock a sufficient quantity of a number of the coals experimented with on the smaller scale to enable these to be assessed.

Seven heaps were accordingly laid down over the period from November, 1933 to February, 1934. These heaps were formed on an open area of ground, each heap measuring approximately 32 ft. × 40 ft. × 12 ft. in height and containing 210 to 220 tons of coal each, the coal being retained in its rectangular form by walls loosely built from the lump coal in each consignment. As each coal was laid down, concurrent deliveries were diverted and carbonized on the large-scale test plant at the Gas Works. The large heaps of coal were exposed to the effects of weathering for approximately 3½ years, and were then lifted and subjected to carbonizing tests under similar conditions to consignments of the same coals direct from the various collieries in 1933.

At the time of recarbonizing, the exterior of the heaps had a dull, lustreless appearance. A certain amount of fissuring of the large outside lumps was observed in most of the coals, but, as was to be expected, the Parrot (Cannel) (7) had not been visibly affected. One coal, however, was worthy of note. This was Wilsontown Main B (9), which on its eastern side was very much fissured and broken and looked liable to disintegrate when handled (fig. 1).

When the heaps were lifted for the final carbonization test it was not possible to estimate how far the fissuring of the lump coal extended into the mass.

Great care was taken that no extraneous matter was included, and the coals were loaded into wagons in such a manner that the outer layer of each heap, which naturally showed the effects of weathering to a greater extent, was carefully mixed with the mass so that a homogeneous mixture was obtained for carbonization.

Test Equipment

The plant used to carry through the large-scale tests consisted of four vertical gas retorts to which were connected the necessary ancillary equipment of condensers, exhauster, scrubbers, purifier boxes and meter. The retorts formed the section of a bench of Woodall-Duckham continuous vertical retorts, each being 25 ft. 6 in. in length, the cross-section at the top being 6 ft. 2 in. × 2½ in., increasing to 6 ft. 6½ in. × 19 in. at the bottom. The nominal capacity is 7 tons of coal per day. The ancillary plant is housed in a building adjacent to the retort house, where there is also a test room for examining the gas continuously during a test.

Figure 1.—*Wilsontown Main B Coal, Showing Fissuring.*

Test Procedure

The weighing, crushing and conveying of the coal to the retorts was carried out by the equipment provided for the normal feeding of the working bench, all precautions to ensure accuracy being observed. Samples of coal representing 0·22 per cent. of the total used were drawn during the test in increments of 51 lb. and sent to the laboratory. In order to keep a daily check on the coal used in the retorts the bunkers were levelled and the quantity calculated from a "capacity" figure. The coke discharged from the retorts was conveyed to wagons for weighing, a 3-lb. increment per retort per discharge being collected for analysis. The retort temperatures were read by means of a disappearing filament pyrometer at intervals of 4 hours and adjustments made if necessary to maintain steady temperature conditions. A continuous record of the gas calorific value was obtained from a Sigma recording calorimeter, which was checked at frequent intervals by determinations on a Boys calorimeter.

In the original tests, tar and liquor were collected in a common tank, but as difficulty was experienced in obtaining

satisfactory separation and accurate measurements, a labyrinth separator, designed at the Fuel Research Station, and vertical cylindrical calibrated tanks, were installed to deal with the liquid products. The steam to the retorts was passed through calibrated nozzles and the quantity calculated from steam flow tables, but, as the weight balances in the original series of tests showed losses larger than are customary in such tests, a Kent flow type of steam meter was introduced. All water supplied to the system and any overflow of condensate was measured and allowed for in the balance sheet. Prior to each test the retorts were scurfed and then followed a few days' preliminary trial using the test coal, in order to allow conditions to be adjusted for the production of gas of 475 B.Th.U. per cu.ft.

Details of Carbonization Tests

Table 1 shows the main details of the results from the coals tested, before and after weathering, the corresponding index number of the test on the small heap being used for reference. The conditions for the tests after weathering were set so that the temperature of carbonization, the throughput of coal per retort and the percentage of steam were as near as possible the same as in the original test. It was felt that by so doing a much better comparison of the effects of weathering would be obtained. As regards the tar and liquor, no special arrangements were made to assess any changes in these products.

Since Gas Undertakings have to maintain their supplies at a declared calorific value, whether using stock coal or not, it may be mentioned here that with some of the coals included in these tests it was known from experience that the production of 475 B.Th.U. gas from them in vertical retorts, after a period of storage, entailed some adjustment in the normal rate of throughput and of steaming. There was also the difficulty created by the loss of caking power of some of the coals, causing partially carbonized material to run past the extractor device, the throughput in such circumstances being controlled by the amount of coke withdrawn at the discharge periods.

The behaviour of the various coals in the test plant was briefly as follows:

Four Feet (1).—A coal easy to carbonize in vertical retorts, being non-swelling and only weakly-caking. On re-test after weathering there was no tendency towards "running" in the retorts and apparently this coal had retained to a fair degree its weakly-caking nature. Some trouble was experienced in the later test on account of the large percentage of smalls and the consequent segregation in the bunkers, thus giving rise to fluctuations in the calorific value of the gas produced.

Great A (2).—A coal similar to the preceding one, having a swelling number of 1 and easy to carbonize when freshly mined. On re-test some difficulty was encountered in controlling the throughput owing to the loss of caking power.

Allanton Upper (4).—A caking coal easy to carbonize in retorts in new condition and free from scurf, but tending to hold up if the retort face is irregular. The swelling number of 2 has dropped to 1 after weathering, but there was still a tendency towards stickiness in the retort, and any irregularities in throughput were due to this cause rather than to difficulties due to coke extraction.

Great B (6).—A weakly-caking coal, easily carbonized when freshly mined, and containing a proportion of cannel, which, however, does not appear to improve its gas making qualities. The proportion of smalls below 1 in. in the coal was high when laid down, and on being uplifted the percentage was almost identical. On re-test the breeze content of the coke was so great that the throughput was controlled with difficulty.

Parrot (Cannel) (7).—This cannel is a material easy to carbonize, owing to its lack of caking properties, the characteristic shapes of the broken coal being retained in the coke. No "rodding" of the retorts is required to assist the movement of the charge, and there is no tendency to "run". After weathering, only slight alteration in carbonizing procedure was required, although the coke produced was somewhat smaller in size.

Wilsontown Main A (8).—This coal can be carbonized without difficulty provided the retorts are well "rodded" at frequent intervals. On re-test, the proportion of small coke formed created slight difficulty with the throughput control, the average number of conveyor buckets of coke drawn per retort being 7·6 compared with 11·1 in 1934 for a similar throughput of coal. The off-take pipes became encrusted with carbon and had to be augered at least once per shift.

Wilsontown Main B (9).—This coal is easy to carbonize, notwithstanding the swelling number of 3. The

Table 1.—*Carbonization of Weathered Coal in Woodall-Duckham Vertical Retorts. Results expressed per ton of coal as charged, before and after weathering.*

Index Number.	1		2		4	
Name of Coal.	Four Feet.		Great A.		Allanton Upper.	
	Before.	After.	Before.	After.	Before.	After.
1	2	3	4	5	6	7
Duration of weathering, months		43		42		43
Date of test	October, 1933	June, 1937	November, 1933	May, 1937	October, 1933	June, 1937
Temperatures of chambers, ° C.	1,379	1,361	1,361	1,352	1,377	1,357
Temperatures of check tile, ° C.	1,200	1,195	1,151	1,127	1,197	1,182
Steam per cent. of coal	17·0	16·5	15·0	16·0	17·0	16·6
Coal:		(1)				
Total carbonized, tons	95·66	64·66	92·90	91·41	90·76	87·47
Amount per retort, tons per day	7·97	8·08	7·74	7·62	7·56	7·29
Moisture, per cent.	12·50	5·43	8·80	6·60	6·42	6·40
Ash, per cent.	6·10	8·28	4·20	3·71	7·10	5·30
W.D. swelling number	1	1	1	1	2	1
Graded < 1 in.	29·7	40·3	30·6	41·3	29·6	41·2
Graded > 1 in.	70·3	59·7	69·4	58·7	70·4	58·8
Coke:					(1)	
Total produced, tons	55·25	38·59	58·00	50·75	38·95	50·03
Yield per ton coal, cwt.	11·50	11·93	12·48	11·11	12·73	11·43
Volatile matter	2·94	2·11	3·00	2·13	3·02	2·20
Ash	15·63	12·56	9·93	7·00	11·63	8·60
Graded < 1 in.	21·8	21·6	15·4	43·0	20·0	27·4
Graded > 1 in.	78·2	78·4	84·6	57·0	80·0	72·6
Gas:						
Total volume, cu.ft.	1,625,009	1,208,000	1,524,056	1,627,000	1,622,734	1,884,000
Yield per ton coal, cu.ft.	16,987	18,680	16,405	17,790	17,880	21,540
Yield per ton coal, therms	80·73	85·86	78·02	78·45	84·96	95·68
Yield per retort, cu.ft.	135,417	151,000	127,005	135,600	135,228	157,000
Yield per retort, therms	643·4	693·7	603·9	597·8	642·3	697·5
Specific Gravity	0·471	0·485	0·460	0·507	0·472	0·505
Calorific Value, B.Th.U. per cu.ft.	475·2	459·5	475·6	440·8	475·2	444·1
Fuel Used:						
Coke per ton coal, cwt.	2·65	2·49	2·53	2·58	2·77	2·52

(1) 2 days

TABLE 1 (*Continued*).—*Carbonization of Weathered Coal in Woodall-Duckham Vertical Retorts. Results expressed per ton of coal as charged, before and after weathering.*

Index Number.	6		7		8		9	
Name of Coal.	Great B.		Parrot (Cannel).		Wilsontown Main A.		Wilsontown Main B.	
	Before.	After.	Before.	After.	Before.	After.	Before.	After.
	8	9	10	11	12	13	14	15
Duration of weathering, months	42		42		42		42	
Date of test	Feb., 1934	July, 1937	Feb., 1934	August, 1937	Jan., 1934	July, 1937	Jan., 1934	July, 1937
Temperatures of chambers, ° C.	1,378	1,382	1,395	1,402	1,369	1,368	1,389	1,405
Temperatures of check tile, ° C.	1,176	1,182	1,153	1,155	1,181	1,177	1,176	1,182
Steam per cent. of coal	11·0	11·2	25·0	25·0	14·3	12·3	12·0	11·3
COAL:								(2)
Total carbonized, tons	85·33	87·87	61·51	60·81	93·28	96·58	83·38	28·26
Amount per retort, tons per day	7·11	7·39	5·13	5·07	7·77	8·05	6·95	7·06
Moisture, per cent.	9·61	10·57	3·87	3·43	7·42	9·70	6·63	7·33
Ash, per cent.	4·10	4·47	4·25	4·04	6·05	4·04	5·10	5·36
W.D. swelling number	1	1	1	1	4	1	3	1
Graded <1 in.	44·4	44·7	30·6	21·8	37·5	49·7	38·5	45·2
Graded > 1 in.	55·6	55·3	69·4	78·2	62·5	50·3	61·5	54·8
COKE:	(1)							
Total produced, tons	37·85	50·51	32·95	26·60	59·50	56·46	50·85	16·22
Yield per ton coal, cwt.	13·39	11·50	10·72	8·75	13·19	11·69	12·20	11·48
Volatile matter	2·80	2·76	2·96	2·20	3·21	3·20	2·55	1·51
Ash	7·73	9·70	8·47	9·07	8·15	7·70	7·78	7·43
Graded <1 in.	24·7	48·6	30·6	37·0	24·3	53·9	17·9	42·1
Graded > 1 in.	75·3	51·4	69·4	63·0	75·7	46·1	82·1	57·9
GAS:								
Total volume, cu.ft.	1,375,028	1,515,000	1,412,409	1,582,000	1,628,317	1,625,000	1,434,605	531,100
Yield per ton coal, cu.ft.	16,114	17,240	22,962	26,010	17,456	16,830	17,207	18,790
Yield per ton coal, therms	76·43	77·87	109·17	121·10	83·00	73·84	81·79	83·12
Yield per retort, cu.ft.	114,586	126,300	117,701	131,800	135,693	135,400	119,550	132,800
Yield per retort, therms	543·4	575·5	560·0	614·0	644·9	594·4	568·4	586·8
Specific Gravity	0·439	0·482	0·498	0·537	0·439	0·491	0·437	0·482
Calorific Value, B.Th.U.per cu.ft.	474·3	451·7	475·4	465·2	475·5	438·8	475·3	442·2
FUEL USED:								
Coke per ton coal, cwt.	2·58	2·44	2·69	2·76	2·67	2·30	2·75	2·49

(1) 2 days
(2) 1 day

throughput was easily controlled in the later test, although, owing to the reduction in size, only 7·8 buckets, compared with 11·9 in 1934, were drawn per retort at the discharge periods. Owing to a plant breakdown, only one day's run is recorded.

CARBONIZATION EXPERIMENTS

The procedure and process of carbonizing these seven coals is entirely different from that adopted in the small experimental plant, and therefore comparison is not possible, but reference may be made to the figures in certain instances where it is thought relevant. The principal difference which prevents comparison is that the small plant is a horizontal retort producing "straight" coal gas, whereas in these industrial scale tests the gas is a mixture of coal gas and water gas due to the passing of steam through the hot coke before discharge.

RETORT TEMPERATURES

The retort temperatures in this plant, being operated and controlled by mechanical draught, are not affected by atmospheric conditions as was the case in the small test plant, and therefore it has been possible to reproduce fairly accurately the combustion chamber temperature. The maximum difference was 20° C. in the chambers, while the bottom temperatures as measured at the check tile have been reproduced, so that the difference between the two tests on any one coal does not exceed 24° C. It was considered that differences of this order, or even higher, would not affect the results to any measurable extent. The percentage of steam admitted to the retorts for the production of water gas in the original and final tests was intended to be comparable notwithstanding an altered method of measurement. The steam is calculated as a percentage of the weight of coal as charged to the retorts.

In spite of the difficulties mentioned concerning controlling the throughput of the retorts owing to disintegration of the non-caking coals after storage, it is satisfactory to note that it has been possible in each test to keep exact control of it.

CHANGES IN COMPOSITION OF COAL DURING STORAGE

The proximate analyses of the seven coals as used in the two series of tests are shown in Table 2.

Owing to the increased handling to which the weathered coals were subjected as compared with the fresh coals which were tipped straight from the wagons into the elevator boot of the "breaker" plant, it is not possible to say with any degree of accuracy how much breakage was due to weathering effects and how much to mechanical breakage. From the appearance of the large coal (see fig. 1) forming the outer walls of the heaps, much fissuring had taken place in the bright soft coals and these, on handling, generally fell to pieces. It must be accepted, however, that size deterioration takes place in most types of coal to varying degrees, and although this deterioration will be reflected in the size of coke from non-caking coals, in the case of a coal of good caking properties a considerable recovery in size may be expected, the amount of which will be dependent to some extent on whether carbonization is static or mobile.

Relative to the small heaps laid down simultaneously, it is difficult to estimate the quantity of small coal in these large consignments. An attempt was made to obtain some measurement of the degree of disintegration due to weathering in the small tests, and the percentages of coal passing a 1½-in. mesh screen from the portions taken for each carbonization test are shown in Table 3. Some of these figures are of considerable magnitude, and of the seven coals forming the series for the large-scale tests four exceeded 10% of small coal passing through the 1½-in. sieve. Great A (2), which was not screened before storing, has been excluded. It may be assumed, therefore, that the quantity of small coal formed from the large heaps would not be less than the amounts reported in connexion with the small retort tests and might possibly exceed these owing to the additional handling which they received. An estimate of 15% appears to be a fairly reliable figure to set against the breakage to less than 1½ in. caused by storage and handling.

EFFECT OF STORAGE ON COKE YIELDS

The proximate analyses and size gradings of the cokes are included in Table 2. It is noteworthy that the coke shows a decrease in volatile matter after the coal has been stored. In addition, the coke yields calculated to a basis of dry coal are very much less after storage than before, the difference ranging from 1·6 to 2·8 cwt. per ton of coal. This decrease is too great to be accounted for by an increase in the amount of steam used, although this might account entirely

TABLE 2.—*Data of Coals and Cokes: Vertical Retort Tests*

Index Number	1		2		4		6		7		8		9	
Name of Coal	Four Feet.		Great A.		Allanton Upper.		Great B.		Parrot (Cannel).		Wilsontown Main A.		Wilsontown Main B.	
Period of Storage, months	0	43	0	42	0	43	0	42	0	42	0	42	0	42
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
COAL—Proximate Analysis:														
Moisture	12·5	5·4	8·8	6·6	6·4	6·4	9·6	10·6	3·9	3·4	7·4	9·7	6·6	7·3
Volatile Matter	33·8	35·2	33·3	35·6	32·3	36·1	33·5	36·3	44·9	46·2	34·5	33·6	34·5	33·1
Fixed Carbon	47·6	51·1	53·7	54·0	54·3	52·2	52·8	48·6	46·9	46·4	52·0	52·7	53·8	54·2
Ash	6·1	8·3	4·2	3·8	7·1	5·3	4·1	4·5	4·3	4·0	6·1	4·0	5·1	5·4
W.D. Swelling Number	1	1	1	1	2	1	1	1	1	1	4	1	3	1
COKE—Proximate Analysis														
Moisture	8·0	0·5	4·1	0·6	3·4	1·5	2·1	0·7	10·4	6·2	3·0	0·8	1·6	0·7
Volatile Matter	2·9	2·1	3·0	2·1	3·0	2·2	2·8	2·8	3·0	2·2	3·2	3·2	2·6	1·5
Fixed Carbon	73·5	84·8	83·0	90·3	82·0	87·7	87·4	86·8	78·1	82·5	85·6	88·3	88·0	90·4
Ash	15·6	12·6	9·9	7·0	11·6	8·6	7·7	9·7	8·5	9·1	8·2	7·7	7·8	7·4
COKE YIELDS (Dry Basis):														
Cwt. per ton	14·3	12·7	14·3	12·0	14·1	12·4	15·1	13·0	12·4	9·6	14·7	11·9	13·3	12·5
COKE GRADINGS:														
Average size, in.	1·38	1·47	1·50	1·13	1·51	1·37	1·37	1·02	1·25	1·09	1·47	0·96	1·66	1·22

for the decrease in volatile matter. What the decrease in coke yield was due to cannot now be determined, although it may have been due in part to a greater conversion of steam; a decrease so occasioned could amount only to about 0·5 cwt. of coke. When the screen analyses of the cokes are compared, it is immediately evident that coals of relatively low caking power lose sufficient caking power on storage to produce a coke of very small size. This decrease in size of the coke constitutes a serious loss of revenue.

Three of the low-caking coals show the expected falling off in caking properties, but Four Feet (1) has actually shown a slight improvement. This coal was stated to be similar to previous consignments, *i.e.*, drawn principally from the Four Feet seam at Carberry Colliery. As, however, these coals were sold under trade names from collieries working several seams, which probably varied in caking properties, it is possible that the proportions of the seams in each consignment change from time to time. This slight improvement in the coke from weathered Four Feet coal may be attributed to an admixture with a seam of better caking properties than the Four Feet seam of which consignments have generally consisted.

TABLE 3.—*Disintegration of Coal During Storage; Represented by Quantity Passing Through 1½-In. Sieve*

(Results as Percentages)

Index No.	Name of Coal.	Period of Storage. Months.			
		0	15	24	44
1	2	3	4	5	6
1	Four Feet	0·0	8·4	10·2	11·1
2	Great A	—	22·6	30·1	23·5
3	Six Feet	0·0	6·4	6·6	8·3
4	Allanton Upper	0·0	6·2	8·0	7·9
5	Parrot	0·0	8·1	9·1	11·6
6	Great B	0·0	11·9	12·7	16·0
7	Parrot (Cannel)	0·0	2·7	3·3	4·3
8	Wilsontown Main A	0·0	11·1	10·3	14·2
9	Wilsontown Main B	0·0	10·0	11·0	14·7
10	Shotts Gas	0·0	10·7	9·0	11·3
11	Twenty Inch	0·0	9·4	10·9	11·2
12	Nine Feet	0·0	8·7	8·6	14·6
13	Wilsontown Main C	0·0	22·0	20·3	28·4
14	Kilsyth Coking	—	—	—	—
15	Bannockburn Main A	—	—	—	—
16	Bannockburn Main B	—	—	—	—
17	Kilsyth Coking : Meiklehill Main	—	—	—	—
18	Lochgelly Splint	0·0	3·3	3·4	5·4
19	Bowhouse	0·0	4·4	4·4	7·1
20	Diamond	0·0	5·3	3·2	6·4

EFFECT OF STORAGE ON YIELD OF GAS

From the point of view of the Gas Industry, the yield and quantity of gas is of primary importance, particularly the latter, in view of the operation of the Gas Regulations Act, which enforces a declared calorific value of gas to be maintained under penalizing conditions.

It will be observed that six of the seven coals showed an increase in the make of gas per ton of dry coal carbonized after weathering, the exception being Wilsontown Main A (8), which shows a decrease of 220 cu.ft., or 1·2 per cent. The amount of this fall in gas yield could be considered within experimental error, as also could the increase of 1·8 per cent. set against Four Feet (1). The most outstanding gains in volume are those of Allanton Upper (4), amounting to 3,910 cu.ft. per ton, or 20·4 per cent., and Parrot (Cannel) (7), amounting to 3,040 cu.ft. per ton, or 12·8 per cent. The calorific values of the gas from the entire series of weathered coals show declines ranging from 10 to 37 B.Th.U. per cu.ft. or, on a percentage basis, from 2·1 to 7·7 per cent.

These gains in volume and losses in calorific value are reflected variously in the thermal yield. Four Feet (1) and Great A (2), for instance, return losses of 1·4 and 1·5 per cent. respectively, with Wilsontown Main A (8) showing the considerable fall of 7·9 per cent. in therms. The remaining four coals have all produced an increased number of therms, Parrot (Cannel) (7) having the substantial gain of 11·8 per cent.

Four Feet (1) and Great A (2) coals were capable of producing "straight" coal gas of 537 and 506 B.Th.U. per cu.ft. respectively after 3½ years' exposure, and taking into consideration that the steam passed into the retorts during the final tests amounted to 16 per cent., the production of 475 B.Th.U. gas from these two coals seems within the range of possibility by decreasing the percentage of steam. The apparent deterioration of Wilsontown Main A (8) is difficult to explain in view of the fact that the Wilsontown Main B (9) consignment was drawn from the same seam at an adjacent colliery. It is also interesting to note that in the small test plant this coal produced gas of 579 B.Th.U. after 44 months' storage, a calorific value which is only 7 B.Th.U. below that obtained from the freshly-mined coal.

If these losses in therms are attributed to storage, an attempt must be made to explain the considerable increases in both volume and therms recorded by at least two of the other coals. A suggestion that the increased gas volume was due to increased decomposition of steam caused by the large increase in small coal giving a closer packed retort charge cannot be considered in view of the finding in the Fuel Research Board's Technical Paper No. 26.* That these increases in volume are due to water gas will be shown in the following pages dealing with the composition of the gases.

Table 4 shows the gas analysis and volume of constituents per ton of coal carbonized before and after storage.

The principal features noticed in the laboratory gas analyses are the general increases in the percentage of carbon dioxide, carbon monoxide, and nitrogen, and the tendency for the methane and hydrogen to decrease. Dealing with the total volume of each constituent per ton of dry coal carbonized, in addition to the carbon dioxide, carbon monoxide and nitrogen showing increments, hydrogen has shown substantial increases in two tests, three very slight increases and two decreases, one of which is of considerable dimensions. Methane shows a notable decrease in four cases, two in which there is little change, and one increase.

* Fuel Research Technical Paper, 26, 1937, "The Influence of Size of Coal During Gas Manufacture".

TABLE 4.—*Data Dealing with Gaseous Products from Large-Scale Tests*

Index Number	1		2		4		6		7		8		9	
Name of Coal	Four Feet.		Great A.		Allanton Upper.		Great B.		Parrot (Cannel).		Wilsontown Main A.		Wilsontown Main B.	
Period of Storage, months	0	43	0	42	0	43	0	42	0	42	0	42	0	42
	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gas Analysis:														
CO_2	2·7	4·1	2·6	4·6	2·8	3·2	1·8	3·0	1·1	2·1	1·8	3·8	2·1	2·0
C_nH_m	2·1	2·2	2·1	1·9	2·1	2·2	2·3	1·8	3·1	3·1	1·9	1·7	2·0	1·9
O_2	0·5	0·2	0·3	0·3	0·2	0·3	0·3	0·3	0·3	0·5	0·3	0·5	0·3	0·2
CO	22·6	20·2	20·8	22·6	19·8	24·6	22·0	24·7	27·6	29·5	21·5	21·4	21·0	24·6
CH_4	15·4	15·9	16·0	13·2	17·2	12·1	15·1	13·9	14·5	11·7	15·7	15·9	16·2	13·6
H_2	51·4	50·8	53·0	50·7	51·3	51·3	54·3	50·2	48·6	46·2	53·5	48·1	53·7	49·1
N_2	5·3	6·6	5·2	6·7	6·6	6·3	4·2	6·1	4·8	6·9	5·3	8·6	4·7	8·6
Gas Volume, cu.ft. per ton dry coal	19,410	19,750	17,990	19,040	19,100	23,010	17,820	19,280	23,880	26,920	18,860	18,640	18,420	20,270
Calorific Value, B.Th.U. per cu.ft.	475	459	476	441	475	444	474	452	475	465	475	439	475	442
Therms per ton dry coal	92·2	90·8	85·5	84·0	90·8	102·2	84·5	87·1	113·6	125·3	89·6	81·7	87·5	89·6
Volume of gas constituents per ton dry coal:														
CO_2	524	792	432	875	544	736	321	578	270	570	339	709	385	410
C_nH_m	407	412	377	362	402	506	409	347	748	839	358	321	325	388
O_2	97	42	54	57	38	59	53	38	78	124	57	93	43	43
CO	4,387	3,973	3,741	4,304	3,781	5,662	3,920	4,755	6,602	7,944	4,055	3,983	3,874	4,990
CH_4	2,992	3,118	2,878	2,511	3,284	2,779	2,690	2,673	3,460	3,143	2,966	2,958	2,977	2,760
H_2	9,982	10,080	9,530	9,640	9,798	11,810	9,680	9,690	11,620	12,430	10,080	8,950	9,890	9,940
N_2	1,028	1,342	970	1,276	1,260	1,453	748	1,197	1,122	1,875	1,000	1,617	866	1,730

Great A (2), Allanton Upper (4), Parrot (Cannel) (7), Wilsontown Main B (9), all show substantial increases in either carbon monoxide or hydrogen or in both. Four Feet (1) shows a decrease in carbon monoxide, with a slight increase in hydrogen, Great B (6) an increase in hydrogen and a very small decrease in carbon monoxide, but Wilsontown Main A (8) shows a decline in both constituents, the carbon monoxide loss being small.

These increased amounts of water gas constituents and the almost general increase in total volume of gas accompanied by slight decreases in the calorific value, call for an examination of the quantity of steam passed into the retort. Reference has already been made to the change in method of measuring this item. These observed increases in water-gas constituents may have been the result of excessive steaming in the final tests, and the following calculations may throw light on the probability. Allanton Upper (4) yielded increased water gas constituents amounting to 3,884 cu.ft. If this is deducted from the 21,540 cu.ft. produced in the final test, the volume becomes 17,656 cu.ft. per ton of dry coal. The volume measured in the original test was 17,880. A mixture of 17,656 cu.ft. of 475 B.Th.U. gas with 3,884 cu.ft. of water gas of 300 B.Th.U. produces a gas of 444 B.Th.U. per cu.ft. The determined calorific value of the gas from weathered Allanton Upper coal (4) was 444 B.Th.U.

A calculation on similar lines has been made on the gas yields from the Parrot (Cannel) (7) and the figures are shown in Table 5.

Whatever may be the explanation of the variations in the

TABLE 5.—*Gas Yields from Allanton Upper and Parrot (Cannel) Coals*

Name of Coal.	Gas Volume.			Calorific Value (Final Test).	
	Initial Test.	Final Test.	Increase of H_2 and CO in Final Test.	Calculated, Assuming a Mixture of 475 B.Th.U. Gas and 300 B.Th.U. Gas.	Determined, Using Boys Calorimeter.
	Cu.Ft. per Ton Dry Coal.	Cu.Ft. per Ton Dry Coal.			
1	2	3	4	5	6
Allanton Upper (4)	17,880	21,540	3,884	444	444
Parrot (Cannel) (7)	22,960	26,010	2,140	461	465

other coals tested, it would appear that so far as Allanton Upper (4) and Parrot (Cannel) (7) are concerned, the increased volume and the decline in calorific value can be attributed to dilution with water gas. It may be assumed, therefore, that the percentage of steam passed into the retorts in the initial tests has been over-estimated in the case of these coals, and possibly also in the others.

It seems fairly reasonable to conclude that Allanton Upper (4) and Parrot (Cannel) (7) have both weathered remarkably well, and so far as their gas making properties are concerned have shown no deterioration. As regards the remaining coals, it is probable that although they have deteriorated during storage in varying degrees, this decline may not be so serious as was at first thought. Based upon the data from the small-scale retorts and the volumes and gaseous therms from the large-scale tests, it would appear possible to produce a gas of the standard 475 B.Th.U. from these coals by a suitable adjustment of the percentage of steam. This adjustment would probably cause diminutions in gas volume, to varying degrees, and also a decline in the therms.

EFFECT OF STORAGE UPON COSTS OF GAS MANUFACTURE

It is possible to calculate from the vertical retort experiments the approximate cost to the Gas Undertaking of storing coal which has a tendency to lose caking power during storage. In the first instance a small cost is involved in stacking the coal and lifting it again, and in the reduction of size which this handling causes. The most important cause of increased cost, however, lies in the fact that the proportion of lump coke produced from stored coal may be very much less and the revenue from coke sales reduced. The thermal yield of gas may also be less, but the loss would have relatively less effect. This conclusion applies particularly to the coals under consideration, where the normal caking power of the fresh coal leaves only a small margin of safety. In other coal-fields where the caking power of the fresh coal is higher, storage may be possible for much longer periods before a stage is reached where the proportion of breeze in the coke is increased to any extent.

Attention has already been drawn to the anomalous nature of the yields of coke in this series of experiments. It is impossible, therefore, to calculate directly the increased cost of gas in each case, and the calculations of cost have been based, not on actual yields of lump coke and breeze, but on proportional yields. Table 6 shows the increase in the percentage of breeze produced by the fresh coal, and by coal carbonized after about 42 months' storage. In the case of Four Feet coal (1) the difference is negligible, but in every other case the proportional increase of breeze is marked.

If the mean yield of total coke be taken at about 14 cwt. per ton of coal in the case of both fresh and stored coal and the sale prices of both lump coke and breeze at 30s. and 10s. per ton respectively, the increase of cost of coal per therm of gas can be calculated.

It is sufficient for the present purpose to calculate two examples from Table 6. In the case of Allanton Upper coal (4) the breeze content of the coke increased from 20 to 27·4 per cent. during storage. This increase reduced the revenue from coke produced by 1s. per ton of coal. Taking Wilsontown Main A coal (8) the breeze increased from 24·4 per cent. from the fresh coal to 53·9 per cent. from the stored coal. In this case the decrease of revenue

amounted to 4s. per ton of coal. Taking a mean gas yield of 90 therms, these decreases mean an increased cost per therm of gas made of 0·13d. in the case of Allanton Upper coal (4) and 0·54d. in the case of Wilsontown Main A coal (8). On an average cost of gas of 1·2d. per therm these increases represent 11 and 45 per cent. respectively.

It should be realized that all the coals examined in this series were of a rather weakly caking type and storage for

TABLE 6.—*Increase in Breeze Produced by Fresh Coal*

	Percentage of Total Coke.	
	Before.	After 42/43 Months.
1	2	3
Four Feet (1)	22·0	21·5
Great A (2)	15·4	43·0
Allanton Upper (4)	20·0	27·4
Great B (6)	24·7	48·6
Parrot (Cannel) (7)	30·6	36·8
Wilsontown Main A (8)	24·4	53·9
Wilsontown Main B (9)	17·8	42·0

even a short time would seriously affect their caking value. Consequently, the conclusions cannot be taken to apply generally to all gas coals. It can be therefore concluded that for coals of this particular type storage for 42 months is sufficient greatly to increase the net cost of coal per therm of gas produced, taking into account only the reduction in size of the coke available for sale.

With coals having a sufficient reserve of caking power the effects may be slight even after 4 years' storage. As caking power decreases storage does involve an increased cost of production of gas; in the case of coal which is just sufficiently strongly caking when it is fresh the loss of caking power will produce in time a coke so much poorer in quality as noticeably to diminish the revenue from its sale.

CONCLUSIONS

When the results from the various Sections of the Paper are summarized, the difficulties of sampling become very apparent. If it were assumed that there were errors in some of the initial results, a number of anomalies would disappear. The irregularities that keep occurring in the initial tests seem therefore as if they may have been due to the extreme difficulties commonly experienced in sampling wagons of coal composed of large lumps with different quantities of small sizes. The mixed nature of the coals increased these sampling difficulties, and leaves it an open question how far this variation would affect the stored coal, which was arranged on a fixed plan and left little latitude in the method of sampling to be adopted later in the small retort tests.

Another difficulty that has become apparent in the course of the tests is the variation in quality of "trade" named coals at collieries where a number of seams of different properties are being worked.

Reference has already been made to Four Feet coal (1), which, when examined in the laboratory and tested in the small experimental retorts, behaved like the non-coking coal it was known to be from previous experience, yet, when the large consignment was carbonized in the continuous vertical retort, exhibited distinct coking properties.

Taking the difficulties, etc., into account, a number of definite conclusions emerge:

1. Most of the coals examined show a tendency to increase in air-dry moisture content on storage. This is, of course, an accepted indication of oxidation. The increase in the present series of tests is of the order of 1 per cent., but will vary with the rank of the coal.

2. The oxygen contents of the coals show an increase on storage which may be about 2·5 per cent. in non-caking coals and 1·5 per cent. in the caking varieties. The higher the rank of a coal, the less is the tendency to oxidation.

3. The calorific values show only a slight decrease after four years' exposure, but the determined values, when compared with the values calculated from the corresponding ultimate analyses, show divergences that are not uniform. The average annual loss of calorific value is about 0·15 per cent. of the original calorific value of the dry, ash-free coal.

4. The coking property reacts more noticeably to the effects of storage than any other property. Coals with a low caking power of 15 or less have too small a reserve of agglutinating properties to be able to produce a coherent coke after some comparatively short time of storage. Those with a higher caking index, 18 and upwards, have a larger reserve of agglutinating power, so that, although they do lose caking power on being stored, they may retain sufficient to produce a massive coke unless the period of storage is altogether too long.

The loss of caking power is reflected in the grading of the coke; especially in the grading of the coke produced in the vertical retorts, in which the charge is mobile. As was anticipated, the low-caking coals have deteriorated markedly, whereas the caking coals had sufficient agglutinating power to allow a lump coke to be formed after four years of storage. There are, of course, irregularities in both groups.

5. The variations in the Gray-King assay results are of a nature which make conclusions unreliable. There is, however, a noticeable change in quality of the coke produced, indicating a loss of caking properties.

6. The coke yield obtained from the assay at 900° C. shows no change. There is a tendency for the tar to decrease and for the liquor to increase, both changes indicating oxidation. The gas yield by volume shows on the whole only a very slight decrease, but this is more than offset by an increase in calorific value, and the thermal gas yield tends on the whole to show an increase. Although an explanation of the increased therms is possible in the large-scale tests, the slight upward tendency in this series is inexplicable.

7. The small experimental retort tests also show no change in coke yield; the gas yield, however, like that obtained in the assay, shows little change in volume, but, unlike it, shows a general decrease in calorific value with a consequent decrease in thermal yield.

8. The tests in the full-scale continuous retorts show a definite increase in the volume of gas, accompanied by a fall in the calorific value and an increase in water gas constituents; these changes combined to produce results which, though contradictory, increase the thermal gas yield, but they can be accounted for most plausibly by variations in the steaming.

9. Summarized, the results of the experimental work carried out seem to indicate that it is not desirable to place in storage coals of low caking index for use in gas production. It is not so much from the point of view of the quality of the gas produced but the difficulties created in controlling the throughput of low-caking coals containing large percentages of small size material. Coals of good caking qualities will give less trouble and yield a reasonably massive or coherent coke, but some knowledge of the capability of these caking coals to retain their caking properties should be available in making a selection.

In the preparation of this Paper, dealing with numerous tests covering a period of years, much assistance of an advisory and practical nature has been put at the disposal of the Authors. They wish, therefore, to place on record their thanks to Dr. F. S. Sinnatt, Director of Fuel Research, Dr. J. G. King, Chief Chemist, and Mr. R. A. A. Taylor, of the Fuel Research Station, for their advice and assistance both in the carrying through of the experimental work and the drafting of the Paper. They also wish to express their indebtedness to the staff at the Granton Gas Works of the Edinburgh Corporation Gas Department for the painstaking manner in which they co-operated in the carbonizing tests, and to the staff of the Coal Survey Laboratory, Glasgow, of the Department of Scientific and Industrial Research, for the production of the large amount of analytical data which an investigation of this kind necessitated.

ASPECTS OF
The Factories Act

by
A. RONCA,
Works Regulations Officer, Gas Light and Coke Company.

A Paper read to the London and Southern District Junior Gas Association on Feb. 14 at a meeting held at the Home Office Industrial Museum—the PRESIDENT (Mr. S. C. Waldock, of the Gas Light and Coke Company) in the chair.

(*Concluded from p. 500.*)

The Cleaning of Machinery.

In addition to the foregoing requirements respecting the mechanical safeguarding of machinery, the Act calls on the factory occupier to take certain other precautions respecting their safe use. Section 20 prohibits a woman or young person (that is, a person of either sex under 18 years of age) from cleaning any part of a prime mover, or any transmission machinery while it is in motion; or any part of any machine if this would expose the woman or young person to the risk of injury by a moving part of that machine or any machine adjacent to it.

Training of Young Persons.

Another important obligation placed on the employer is the training and supervision of young persons working at dangerous machines. Section 21 states: "No young person shall work at a dangerous machine unless:

(1) He has been fully instructed as to the dangers arising from the various parts and motions of the machine.
(2) Has received a sufficient training in work at the machine, or,
(3) Is under adequate supervision of a person who has a thorough knowledge and experience of the machine."

Warehouses.

In opening this Paper, when dealing with the definition of the term "factory," attention was directed to the fact that certain other sites and processes, other than those included in the definition, were specified as factories.

Section 105 extends the application of the requirements of the Act relating to:

(*a*) Safeguarding of machinery.
(*b*) Cleaning of machinery by women and young persons.
(*c*) Hoists and lifts.
(*d*) Steam boilers.

to warehouses (except those in factories, which are treated as part of the factory) in which mechanical power is used. The expression "Mechanical Power" does not, however, include such mechanical power only for the purpose of heating, ventilating, or lighting. (Section 152, (3).)

Steam boilers means any closed vessel in which for any purpose steam is generated under a pressure greater than atmospheric pressure, and includes economizers used to heat water being fed to any vessel, and any superheater used for heating steam.

The definition covers a variety of plant, but it is important to remember that unless the steam is intentionally generated in the vessel it is not a steam boiler.

Section 29 (1) specifies that every steam boiler must have the following fittings attached to it:

(*a*) A suitable safety valve which must:
  (1) Be separate from any stop valve.
  (2) Be adjusted to prevent the pressure in the boiler exceeding the maximum safe working pressure.
  (3) Be fixed directly to or as close as possible to the boiler.
  (4) If of the lever weight type, have the weight secured in the correct position.
(*b*) A stop valve connecting the boiler to the steam main.
(*c*) A water gauge which must:
  (1) Be transparent.
  (2) Show the correct water level in the boiler.
  (3) Be protected by a transparent guard if the boiler pressure exceeds 40 lb. per sq.in.
(*d*) A steam pressure gauge which must:
  (1) Register the correct pressure in lb. per sq.in.
  (2) Be attached to the steam space.
  (3) Have the maximum working pressure marked in a distinct colour.
(*e*) A distinctive number where one of a range.
(*f*) A special connexion to take a test pressure gauge.
(*g*) A fusible plug or low-water alarm if the boiler is not externally-fired.

Economizers are exempted from the requirements (*b*), (*c*), (*d*), (*e*), (*f*), (*g*), and Superheaters are exempted from the requirements (*c*), (*d*), (*e*), (*f*), and (*g*).

Section 29 (6) also requires that the boiler and its fittings must be examined by a competent person every 14 months, or after extensive repairs. The requirements of this Section need further consideration, as an examination of any plant is useless unless one is fully cognisant of its requirements and terms.

The expression "maximum permissible working pressure" in respect to the boiler and safety valve is one for consideration. There is no doubt that the word "working" was inserted to ensure that the pressure referred to is the working pressure exclusive of any occasional excess pressure caused by the rapid fall in steam consumption—for example, that caused by the shutting down of an engine. The "maximum permissible working pressure" is the safe working pressure stated on the boiler makers' certificate of test or, if it is an old boiler or a second-hand boiler, the safe working pressure entered on the last certificate issued by the competent person making the examination. Usually the competent person is the Boiler Insurance Company's Engineer, and here we must remember this person has the right to reduce the maximum pressure in cases where, in his judgment, the results of the examination show such a reduction of pressure to be necessary. It will be noticed that the word "suitable" is inserted before the words "safety valve." It is intended to ensure that the construction and condition of the valve is such that it will permit steam to escape when a reasonable excess pressure has accumulated in the boiler. But what is a reasonable excess pressure? It is not defined in the Act, so it would be as well to accept the Board of Trade rules, as applied to passenger ships, which are common to those of Lloyds rules for steam ships—viz., a maximum accumulated pressure of 10% with full firing and no feed water being admitted—as being a reasonable excess pressure. The stop valve is a specified fitting and is consequently subject to the periodical examination every 14 months, or after extensive repairs.

Passing to item (*d*)—a steam pressure gauge—the first requirement of this fitting is that it must register the pressure correctly in lb. per sq.in., and here again we are faced with the need of some guidance as to what would be considered correct, and again you would be well advised to work to the limits of accuracy accepted by the Boiler Insurance Company's rules, viz.:

Boiler Working Pressure in Lb. per Sq.In.		Maximum Inaccuracy Lb. per Sq.In., high or low, or hand away from Zero 0 when at rest.
Exceeding.	Not Exceeding.	
0	10	3
10	25	4
25	50	5
50	100	6
100	—	10*

* 10 lb. is the maximum error allowed on any gauge at any pressure above 100 lb. per sq.in.

The last fitting to be considered is a fusible plug, or low-water alarm device required, unless the boiler is externally-fired. The Act does not define what an externally-fired boiler

is, but consideration of the various types of boilers will facilitate an understanding of this term.

Where the fire passes through the water container, the boiler is obviously internally-fired, but where the water container passes through the fire it appears the boiler is externally-fired. Truly it might be argued that some Insurance Companies insist on fusible plugs being fitted to water-tube boilers, but although they are within their rights as a condition of insurance, it does not follow that it is a requirement of the Act.

Conclusion.

In the time at my disposal an endeavour has been made to present those aspects of the Act which are of importance to those in charge of plants and processes on gas-works; but the Paper would not be complete without some consideration being given to that aspect of the Act which might be termed its "Standard of Requirements."

There is a school of thought that considers that having just met the requirements of the Factory Act, they have adopted a very high standard of safety, and having done so, make no attempt to follow the true objects of the Act. Now let us look at the other side. Would any engineer design a plant without allowing any factor of safety in his calculations? No; but why? Because he knows he would be working to a minimum standard without allowance for unexpected happenings. The true aspect of the requirements of the Act is that they are the minimum standards that can be worked to without being open to prosecution in the Courts.

Discussion.

Mr. J. Grayston (Romford), opening the discussion, asked if a ruling had been given as to whether Section 23 applied to elevator chains. One of H.M. Inspectors had suggested to him that it might be necessary to test these for safe working load and repeat the test after every renewal of link pins, &c. Had the Author's Company taken any action to apply Section 27 to purifiers, particularly when emptying and re-filling, or was it their view that the rules suggested by The Institution of Gas Engineers Committee were sufficient? With reference to Sections 28 and 47, had any steps been taken by the Author's Company to apply these Sections to coal stores, elevators, engine rooms, and breaker pits? If so, what was their policy and procedure at their several works? Had Section 47, in the Author's opinion, any application to retort houses, especially vertical retort houses under slight pressure? Had Section 70 any application to young persons—gas fitters' boys, &c.—who might be employed partly as fitters and partly on the works? Had the Author any knowledge of Section 31 applying to gas receivers operating in connexion with high-pressure distribution systems? The Section specified *air* receivers only. Finally, were exhausters classed as unfenced machinery by the Author's Company?

Mr. Ronca said that the question of elevator chains depended upon whether it was a hoisting machine; there were drag-bar conveyors and elevators which were not lifting machines within the meaning of the Act. Section 27 specified work inside any chamber, tank, vat, pipe, flue, or similar confined space in which dangerous fumes were liable to be present. If they took the top off a purifier it was no longer a confined space. The whole Act was designed for the protection of the person, and it was up to gas undertakings to decide whether they were doing all they should in instances not specifically covered by the Act. The term air receiver included a vessel containing compressed exhaust gases; it did not include high-pressure gas used for motor vehicles, &c. With regard to the presence of dust, they always had a practicable alternative—namely, to protect the worker by the provision of a suitable respirator. The question of vertical retort houses was a subject which was coming to the fore in connexion with Section 47, and there was a growing tendency to adopt a mechanical ventilator at the top. If a boy worked in a factory (as interpreted by the Act) he then came under that Act, and gas undertakings would be well advised to treat him accordingly. Exhausters were moving machines and must either be properly protected or fitted with distant lubrication devices. His Company regarded them as machines with which they must take precautions. If a man had to feed a bearing he must be enabled to do so in safety—not in such a way that he could put his shoulder into the flywheel.

Mr. C. B. Staniforth (Ely) asked if fitters' boys were subject to the 44-hour week regulations; also whether lifts must have interlocking devices on all doors.

Mr. Ronca said that the 44-hour week was not compulsory at the moment; but it would be so eventually, he considered. Some district fitters worked actually from the gas-works, while others worked from a separate fittings depôt. If a boy worked from a depôt he was not subject to the Factories Act—for a depôt was not a factory. Lift gates on all landings and on the lifts themselves had to be of the interlocking type.

Mr. F. H. White (Gas Light and Coke) asked if Mr. Ronca could give them an interpretation of the Act in reference to the guarding of temporary structures above 10 ft. from the ground. Also, must steam gauges be connected directly to the steam space?

Mr. Ronca observed that the steam pressure gauge should be fitted as close to the steam space as possible. There was in this Act a clause relating to building; but they must not run away with the idea that the passing of this Act abolished the old Building Regulations. They would find a great deal about this subject in their Building Regulations.

Mr. E. R. Willis (Gas Light and Coke) asked if all lifts must have two ropes or chains.

Mr. Ronca replied that the Act stipulated that every passenger lift must have "at least two ropes or chains separately connected to the cage, each capable of carrying the cage and its maximum load."

Mr. Willis also raised the question of accommodation for employees, washing, drying, &c.

Mr. Ronca mentioned several alternative methods of drying, including the automatic roller towel and the hot-air drying apparatus. He observed that those using the latter sometimes complained of a dryness of the skin; there was a tendency to leave the machine before the hands were properly dried, as close following of the instruction tended to slow down the drying process.

In reply to **Mr. H. W. H. Butterfield** (South Suburban), the Author stated that all boilers serving a common steam main should be provided with isolating valves, between the main and the stop valve, as soon as possible—as they would become compulsory on July 30, 1940. Pits under unloading hoppers must certainly be adequately guarded, he went on; for there were crushers at the bottom, and a very nasty accident might occur. It was a very dangerous piece of plant; if a man fell in he was automatically fed through the crusher like the material. All new gasholders must now be examined every ten years.

In reply to a question as to whether the Chemical Works Regulations were carried forward in the Factories Act, **Mr. Ronca** said that there were under the old Act many Statutory rules very few of which were revoked. Among these, the Chemical, Building, Railways, and Docks Regulations all concerned the Gas Industry in greater or less degree.

Mr. A. F. Grant (Gas Light and Coke) asked whether the changing over of an apparatus to automatic control obviated the need for guard-rails, &c.

Mr. Ronca replied in the negative. The machine must be adequately guarded whether it was automatic in operation or not.

Mr. Grayston raised the question of safeguarding drinking water supplies, particularly if well water was used on a works for drinking purposes.

Mr. Ronca said that samples of water from an artesian well, if required for drinking, should be sent to the public analyst at least once a quarter for testing, and his report should be forwarded to the local authority; in return for this the latter should give the undertaking a certificate of purity. Samples for analysis must, of course, be taken from *all* its sources.

In reply to a question as to whether a gas showroom situated on the site of a gas-works was classed as a shop or a factory, **Mr. Ronca** said that if the premises were not used for the purpose of factory processes, then they were not subject to the Factories Act. Showrooms would, however, be subject to the Shop Regulations. A depôt or stores was not classed as a factory if no assembling was done there.

Mr. H. Moys (Commercial) asked whether benzole plant in which the still was under a slight pressure was subject to the Act.

Mr. Ronca observed that, strictly speaking, the still was a steam receiver and was subject to the Regulations relating thereto. He was, however, almost certain that it was not intended to include this type of plant, and representations had been made with a view to excluding it from the Act. The same thing applied to any segmented column still. If live steam was used under high pressure in the jacket of the still, the proposed exemption would not cover it. If they looked at the Chemical Regulations they would find as an alternative a safety valve or other similar device.

Mr. Moys also enquired whether coke telphers were regarded as hoists.

Mr. Ronca replied that telphers should certainly be examined in accordance with the provisions of the Act, because they were clearly either hoists or cranes. He strongly recommended their regular examination—and all examinations should be recorded, even if only roughly. It was little use stating in court that the plant had been regularly examined if no evidence could be produced to prove it. Replying to further questions, Mr. Ronca said that there were several approved methods of cutting discs from gasholder sheets for examination purposes. A laboratory boy did not come under the Factories Act provided nothing was produced in the laboratory for subsequent sale.

Mr. Butterfield questioned whether the use of power billing machines in offices brought the premises within the definition of a factory.

Mr. Ronca said this depended upon the type of machine in use. Certain of these machines were printing machines and, as such,

rendered the premises subject to the Act. Section 151 dealt with this aspect.

Vote of Thanks.

Mr. G. Dougill (Gas Light and Coke), proposing a vote of thanks to Mr. Ronca for his Paper, emphasized that the points which Mr. Ronca had made should be regarded as minimum clauses and should be interpreted in the spirit that while no Act was perfect they were trying their utmost to give instructions to cover every conceivable contingency. In addition to that, they must bear in mind that there were instances where they could carry out safety precautions which were not strictly called for—simply from a commonsense point of view. They appreciated very much the fact that specialists like Mr. Ronca gave them specialized information which was difficult for them to obtain in the ordinary way, and it was no empty compliment when they offered him their hearty thanks.

Mr. Moys, seconding the vote, observed that the Act had now been on the Statute Book for twelve months, and even after that period many of them who had carefully read through the clauses were not at all clear upon all their implications. They would all agree that Mr. Ronca's explanation of the Act and his answers to their questions had been very helpful indeed.

Mr. Ronca, acknowledging the vote of thanks, agreed that the mere reading through of the Act and trying to understand it was a "tough proposition," and he was, perhaps, fortunate in having to go through all its details before it became law. But having realized that there was a certain amount of difficulty in understanding it, if he had made any one point clearer to them he had been more than repaid for any effort he had expended in preparing the Paper. In conclusion, he paid tribute to the assistance which had always been given by Mr. Murray and all the members of his staff at the Home Office Museum. He had never found anyone who had not been willing to go out of his way to help. If they were ever in difficulties over the proper interpretation of the Act, he advised them to go and see their local Factory Inspector, who would be only too pleased to assist them in any way he could. They would find the Inspectors very painstaking and patient, and it was surprising how much help they could give.

Gas Undertakings' Results

Auckland, N.Z.

The receipts of the Auckland Gas Company, Ltd., of New Zealand, for gas, residuals, fittings, &c., during the year ended Dec. 31 last, amounted to £439,211, as compared with £430,649 for 1937, while the balance on Revenue Account has increased from £67,521 to £98,568. The dividend for the year on the fully-paid shares is 5%, as against 5½% for the preceding twelve months, which will leave about £400 more to carry forward, at £10,838. The balance at Profit and Loss Account is about £5,000 down on this occasion; there being an item for income-tax paid in February, 1938, amounting to close upon £37,000.

Blyth.

The revenue of the Blyth Gas Company for the past year amounted to £44,597, the expenditure to £38,105, and the profit to £6,492. The revenue figure for 1937 was £46,660, the expenditure £37,576, and the profit £9,084. The dividend on the ordinary stock for the past year is 7%, with a carry-forward of £11,243, as compared with a dividend of 8% and a carry-forward of £12,401 in 1937. There has been a reduction of about £1,000 in the income from the sale of gas, and of about £1,500 in receipts from residuals. Rates and taxes are about £800 more. A net addition of about £2,000 to capital expenditure during the year has brought the debit balance on Capital Account up to £9,522.

Chester.

Although, of course, weather conditions during the greater part of 1938 were not conducive to a heavy use of gas for heating, the sales by the Chester United Gas Company again constituted a record. In fact, the demand is steadily increasing, particularly for industrial purposes. The total quantity of gas sold in the past year was 2,319,872 therms, which compares with 2,301,186 therms in 1937. In these satisfactory circumstances, it has become necessary again to enlarge the manufacturing plant, and the work is now proceeding. The carbonizing plant is being increased in capacity from 2 million cu.ft. to 3 million cu.ft. per day. The dividend on the ordinary stock is repeated at 5¼% for the year, which will leave to be carried forward a balance of £7,590—some £250 less than was brought in.

Colchester.

The Directors of the Colchester Gas Company are in the fortunate position of being able to report an increase in sales of gas during the past year—even though it be only the small one of 0·8%. Over the twelve months, too, substantial increases have been recorded in the number of consumers, cookers, heating stoves, and water heaters. An important order was obtained from the War Office for water heaters, and six fish fryers have been installed in the cookhouses at the barracks. The central heating load is steadily increasing, and one important installation of this type carried out during the year was for the entire heating of the Essex and Suffolk Fire Office. The gross profit on Revenue Account amounts to £17,546, after making allocations to the Special Purposes Fund and the Renewal Fund and writing off a substantial sum for depreciation. Manufacturing charges are up by about £2,500. The dividends are 10% and 7% per annum respectively on the "A" and "B" shares.

Cork.

The accounts of the Cork Gas Consumers' Company are made up half-yearly, and those for the six months to Dec. 31 last show that, compared with the corresponding period in 1937, there is an improvement in the rental account and a substantial increase in the cost of labour and rates and taxes. After placing £2,170 to credit of the Depreciation Fund, the balance of the Profit and Loss Account is £4,532, with which the Directors propose to pay the usual dividend at the rate of 8% per annum.

East Surrey.

The business of the East Surrey Gas Company continues to show satisfactory expansion. In the past year sales of gas realized £125,673, as compared with £122,059 in 1937. The Directors recommend the payment of a dividend of 6% for the year on the ordinary "B" stock, which will leave a balance of £3,328 to be carried forward. A year ago the dividend was the same, but the balance carried forward was slightly higher at £4,328. Capital receipts were augmented during the year to the extent of over £60,000, while on the other side the expenditure amounted to £54,000—leaving the Capital Account in debit by a little more than £27,000. The Directors record in their report the fact that the centenary of gas supply in Reigate was marked by the inauguration of an additional gasholder at Redhill.

Hornsey.

A falling-off of 5·6% in sales of gas during the past year is reported by the Directors of the Hornsey Gas Company. The total sales in 1938 were 3,682,931 therms, in addition to which there was sold as benzole 188,661 therms. In the previous year the sales of gas were 3,901,750 therms, in addition to which there was sold as benzole 154,620 therms. The balance carried to Profit and Loss Account is £31,851, as compared with £26,813 a year ago, and the dividends of 7½% per annum on the 5% stock and 6% per annum on the 3½% stock will leave a sum to be carried forward of £14,736—nearly £1,000 less than was brought in. During the year £50,000 of 3¼% redeemable debenture stock was issued, and after a net addition of £10,000 to expenditure, the Capital Account was in credit at the end of the year to the extent of £50,418. The Company's meeting is fully reported in this issue of the "JOURNAL."

Liverpool.

The amount received by the Liverpool Gas Company from sales of gas during the year 1938 was £1,108,217, as compared with a sum of £1,138,019 in 1937. Higher figures for residuals and for rents of cookers, fires, &c., brought the receipts on Revenue Account very near to those of the previous year. A gratifying increase is noticeable in the returns from public lighting. The total revenue for the year was £1,453,436, and the expenditure £1,246,639, leaving a surplus of £206,796 to be transferred to Net Revenue Account, as compared with £207,098 a year ago. The dividend on the ordinary stock for the year is 6%. During the year the Directors considered it advisable to raise the remaining balance of £190,681 of loan capital, and this was done by the issue of 3¼% redeemable debenture stock. The net addition to capital expenditure during the twelve months was more than £100,000—mainly on new cookers, fires,

&c.—and at the end of the year there remained a small credit balance on Capital Account of £25,511.

Newcastle-upon-Tyne and Gateshead.

At yesterday's meeting of proprietors of the Newcastle-upon-Tyne and Gateshead Gas Company (a report of the proceedings of which appears in this issue of the "JOURNAL"), the Directors' statement and the accounts for the year 1938 were presented. The report contained the satisfactory announcement that the sales of gas for the past twelve months show an increase of 1·2% over those of 1937—including in both years the quantity sold in the area of the South Shields Gas Company. The actual sales were 36,145,317 therms. The profit for the year is £199,928, which compares with a profit of £186,475 for 1937. The dividend on the ordinary stock remains at £5 7s. 6d.% for the year, and the carry-forward will be £79,206, as compared with £72,244 a year ago. The Directors record their deep regret at the death of Mr. John Edward Cowen, the Chairman of the Company.

Newport (Mon.).

In their report for the past year, the Directors of the Newport (Mon.) Gas Company announce that further reductions in the price of gas have been made to both ordinary and prepayment consumers. In addition, an attractive optional two-part tariff has been offered to domestic consumers. At the close of 1938 the total number of consumers was 19,255—4,462 ordinary, and 14,793 prepayment. This represents an increase of about 200 on the year. The sale of gas to private consumers totalled 1,388,243 therms, as compared with 1,367,039 therms in 1937. The dividend on the consolidated stock is 5% for the year—the basic rate. This will leave a balance to be carried forward of £4,949. The amount brought forward from the previous accounts was £3,878. During the year there was no net addition to capital expenditure, and the balance at debit of Capital Account is slightly down at £35,295.

Sheffield

The quantity of gas sold for domestic and industrial purposes during the past year by the Sheffield and District Gas Company (a full report of the proceedings at whose annual meeting will appear in the "JOURNAL" later in this month) increased by no less than 681,039,000 cu.ft.—the total sold reaching 10,183,309,000 cu.ft. In addition, a bulk supply of 533,927,000 cu.ft. has been sold to a neighbouring gas undertaking, making a total increase of 779,544,000 cu.ft., or 7·84% on the previous year, and a total sale of 10,717,236,000 cu.ft.—a highly satisfactory outcome of the year's working. The price of gas is 7d. per therm, or 2s. 11d. per 1,000 cu.ft., for small quantities, with proportionate reductions to large consumers—the prices ranging from 2s. 3d. down to 11·625d. per 1,000 cu.ft., according to the quantity supplied. The dividend of 6½% on the consolidated stock for the year will leave a balance of £72,992 to be carried forward, as compared with £71,041 a year ago.

Tottenham.

The report of the Directors of the Tottenham and District Gas Company, which was presented at yesterday's annual general meeting of proprietors, a full account of which will appear in next week's issue of the "JOURNAL," stated that the Company's Order which became operative on July 1 last sanctioned the amalgamation of the Southgate and District Company with the Tottenham Company, and altered the constitution to that of a basic price company. The Order fixed a basic price of 11d. per therm, and a basic dividend at the rate of 5% per annum. The dividend for the past year on the ordinary stock is 6¼%, and after the payment of this dividend, and the transfer of £1,555 to the Reserve Fund, the carry-forward will be reduced by the sum of £16,483. Serious increases in the price of coal have compelled the Directors to advance the price of gas by 1d. per therm. The quantity of gas sold in 1938 was 23,974,240 therms, as compared with 22,407,475 therms in 1937 (or 23,783,440 therms including the Southgate figures for the six months to December, 1937).

Windsor.

The dividends for the past half-year recommended by the Directors of the Windsor Royal Gas Light Company are 6½% on the original shares and £4 11d.% on the new shares, which will leave £2,734 to be carried forward, as against £3,796 a year ago. The dividends for the year are 12½% on the original shares and 8¼% on the new shares. The quantity of gas sold in the past twelve months was 933,729 therms, which compares with 949,950 therms in 1937. Some expenditure during the year on new mains and services brings the Capital Account debit up to £19,593.

SAWER & PURVES

(BRANCH OF METERS LTD.)

Sole Makers of "THE MODEL COIN COLLECTOR"

Ask for Particulars

It will be a pleasure to supply them

Painted and lettered as required

Excellent Finish

BIF 1935 BIRMINGHAM ENGINEERING AND HARDWARE SECTION 20 FEB - 3 MAR SEE OUR EXHIBIT

STAND Ca. 411

TELEPHONE
Manchester 2289
Collyhurst
Nottingham 75202
Watford 2645

TELEGRAMS
Sawer, Manchester
Sawer—
75202, Nottingham
2645, Watford

Derby Road
Watford

ESTABLISHED 1869.

NELSON METER WORKS, MILES PLATTING, MANCHESTER, 10

Radford Meter Works
Radford Road
Nottingham

COMPANY MEETINGS

Bournemouth Gas and Water Company

The One Hundred and Eighteenth Ordinary General Meeting of the Bournemouth Gas and Water Company was held at the London Offices of the Company, 48, Copthall Avenue, E.C. 2, on Friday, Feb. 24—Mr. WILLIAM CASH, J.P., F.C.A. (Chairman of Directors), presiding.

The SECRETARY (Mr. William Cash, Jnr., M.A., F.C.A.) read the notice convening the meeting, together with the Minutes of the previous Ordinary General Meeting, which was confirmed and signed. The list of stockholders was duly sealed; and the Report and Accounts for the year ended Dec. 31, 1938, were taken as read.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN, in moving the adoption of the Directors' Report and Statement of Accounts, referred first to the absence of Lieut.-Colonel H. W. Woodall, who was abroad. He also referred to the paragraph in the Report which recorded the fact that Sir John J. Withers, who had been a Director of the Company for ten years, desired to retire from the Board. They had said in the Report how much they valued the services he had rendered to the Company during this period; his legal knowledge was very considerable, while his knowledge of affairs generally, particularly in his capacity of a Member of Parliament, had been of great assistance, and they were very sorry that he felt it necessary to retire. This had placed them in the necessity of finding a successor, and they were extremely fortunate in securing the services of Mr. Ernest E. Bird. The latter was a solicitor of high standing, a Member of the Council of the Law Society, and Chairman of the Legal and General Assurance Society. Mr. Cash said he had had the advantage of knowing Mr. Bird for some time, as a Director and colleague on the Croydon Gas Company, so he came to them with some knowledge of the work of a statutory gas undertaking and they greatly appreciated his joining the Board.

Capital Account.

Turning to the accounts, the Chairman observed that it would be seen on the left-hand side of the Capital Account that they had expended £2,040 on lands; this included the freehold and tithe redemption in respect of land at Brockenhurst. At Poole they had constructed a new administration block, part of which was charged to water and part to gas. They had also made an addition to the coke plant at Poole, while at Wareham they had put up new showrooms and offices. In the water undertaking there had been expenditure on new turbines at Longham—which was the main expenditure in regard to water with the exception of new mains.

They had laid 38¾ miles of new gas mains, bringing the total mileage up to 674, the cost of the extension being £30,334. The reason this figure was so high was because it included a new trunk main to Wareham and the districts *en route*. They had added nearly six miles to their water mains, bringing the total up to 303 miles. Expenditure on meters, stoves, and fittings for gas accounted for £52,921, while the purchase of the Wareham and Brockenhurst gas undertakings had cost £8,555. It would be observed, however, that a considerable sum had been written off by way of depreciation in respect of the abandoned works at Wareham and Brockenhurst; by this he meant abandoned from the gas manufacturing point of view. This had been written off against the cost of the new mains to replace the works, so that there was a net addition on Capital Account of £74,355.

On the other side of this Account it would be seen that the amount of capital raised during the year had been £130,000, a small amount of sliding-scale stock having been issued to co-partners. Maximum dividend stock had been issued at a minimum price of 157% at a cost to the Company of something under 4½%. £50,000 irredeemable debenture stock had been issued at par. Under their 1938 Act they obtained new capital powers, and stockholders were to be asked to authorize the issue of some of this at the Extraordinary General Meeting which was to follow.

They had taken over the Brockenhurst and Wareham undertakings as from July 1, 1938, and already the consumers in those areas had expressed their gratification at the improved services rendered and the cheaper supply. While on the subject of improved service, he might tell them that nearly 20,000 visits had been paid to consumers to assist and advise them and see that their appliances generally were in good working order, making adjustments where necessary.

Revenue Account.

In the Gas Revenue Account the comparative figures for the previous year were set out alongside, so it was not necessary for him to go through them in detail. He would, however, point out that coal and oil had cost them £8,599 more; repair and maintenance of works, £6,601 more, on top of a similar increase in the previous year.

Repair, maintenance, and renewal of mains and services was up by £6,153, and in this and other respects they also had to take into consideration the increased costs of wages and materials. Rates were up by £1,290. It would be recalled that the Association of Public Lighting Engineers had held their Conference in Bournemouth last year, and it had been necessary for the Company to accord the hospitality which was due to such an important body.

No contribution to Special Purposes Fund was being made from Gas Revenue. The reason for this was that the Fund was now so large that it did not seem necessary to make any addition—the balance carried to the next account being £138,609. It might interest them to know that they had spent £1,552 on A.R.P., in addition to the £2,792 charged to this account in the previous year. It was considered that this expenditure was reasonable and right in the circumstances.

The contribution to the Renewal Fund was slightly more, as they had put the full statuory allowance to that account. The total was therefore up by £21,334, and the profit down by £12,679.

On the other side of the Revenue Account receipts from private rentals were up by £4,792, while those from public lighting were rather less. Rental of meters was up, as also of cookers; the profit on fittings sold was slightly less because this was a net figure after allowing for canvassing and advertising. Residuals showed an increase of £8,159. Sales of gas were up by 1·26%, which, having in view the peculiar year, certain months of which were very mild, was, on the whole, satisfactory. The price of gas during the past year had been 8·4d. per therm, which was a very low price as things were to-day, being equivalent to 3s. per 1,000 cu.ft. This was particularly good when they considered that many gas undertakings were charging as much as 2s. 6d. per 1,000 cu.ft. before the war.

They had added during the year 3,921 new gas consumers and 949 new water consumers, bringing the totals up to 77,916 and 36,319 respectively.

In the Water Revenue Account rentals were up by £3,021 and meters by £132, while expenditure was greater by £1,185. The profit on the water undertaking showed an increase of £1,965. The quantity of water consumed during the year had gone up by 6%, and the price realized overall for water as charged for was down by 3·06d. per 1,000 gallons.

Profit and Loss Account.

The Profit and Loss Account, continued the Chairman, summed up the whole position, and here again the comparative figures for the previous year were set out. The combined profit of the two undertakings was down by £10,714. On the other hand, they had placed only £5,000 to Reserve Fund instead of £10,000. Parliamentary expenses were a special item on this occasion in respect of their 1938 Act, which accounted for £2,443 on expenses, capital duties, &c. There had been no payments in respect of compensations as against £4,553 the previous year, while income-tax was less by £2,908. The final result was that they carried forward £2,362 less then they brought in a year ago, which compared with an increase of £1,089 the year before.

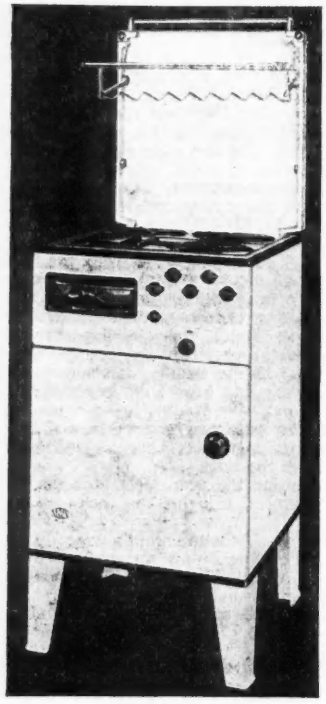
He had referred to the allocation of reserves, and reference to the Balance-sheet would show that their combined reserves, including the carry-forward and after payment of dividends, totalled £566,340, so that their financial position was a very strong one. Investments still showed a surplus on their market value of nearly £12,000; although that was not as much as in 1937. The Pension Fund stood at £373,779, and there again investments showed a substantial surplus of £16,428, though this was only half the surplus of a year before.

During the year 1938, in common with other gas undertakings, they had some extraordinary experiences at Christmas time. The maximum day's demand which occurred on Dec. 21 showed an increase of 24% over any previous maximum, while the increase for the six days was 60% in excess of the previous maximum figure. They had practically all their plant at work and were ready to put some of their older plant into commission. The staff and workpeople were on duty day and night, and all rendered splendid service. The General Manager and officers had a most anxious time. The water undertaking also experienced difficulties as a result of broken mains and burst pipes, &c. It was, however, a valuable test of the Company's capabilities, as he himself could testify, having been in Bournemouth at the time.

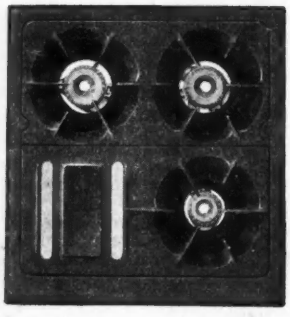
This led to a review of the whole situation, and as their business was increasing it was necessary to embark on additional capital expenditure. At Pitwines a new carburetted water gas plant was to be erected, together with ancillary plant, while it

See the MAIN Stand, Ca 404-505, B.I.F., Birmingham

MAIN 57 "CABINET" GAS COOKER



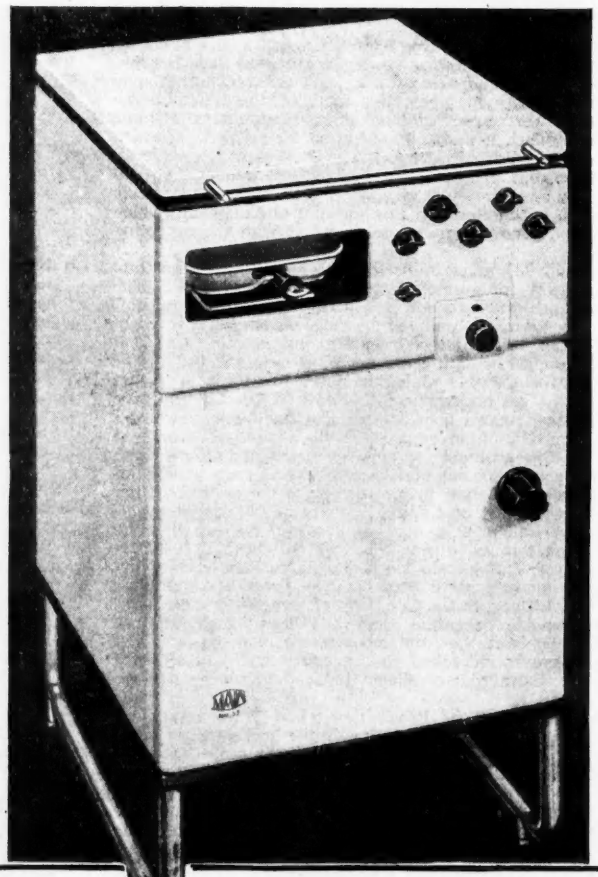
The No. 57 Cooker with Hinged Cover (open), Incorporating Chromium Plate Rack. Other alternatives are the standard Chromium Single Plate Rack with Back-Plate, or the Small-Pattern Back-Plate or the "P.R." Hot-Closet.



The Hotplate is a new design with improved boiling burners and griller which establish a new criterion of performance. Bread can be toasted at the rate of one side every 45 seconds. Automatic flash ignition and a governor are provided.

THE No. 57 is a high-grade model of unique design. Perfectly "stream-lined," there is no break in its contour anywhere. The taps are all mounted on a facia plate. No hinges or latch are visible and the door completely covers the width. A deeper oven is provided, and its linings—back as well as side—are removable for easy cleaning. Offset and reversible grid shelves are provided, and there is a special device for controlling the outward swing of the door. Alternative legs are available, as illustrated, with levelling screws to both types.

For further particulars see "The Main Times," a few copies of which are still available, or write for literature for your Showrooms.



R. & A. MAIN LIMITED London and Falkirk

was also necessary, having regard to the distance, to erect a new gasholder on land which they had acquired many years ago at New Milton. Several new trunk mains were required so that the pressure might be fully adequate during times of heavy demand. A new reservoir of 4 million gallons capacity was being constructed at Alderney—all of which would bring their expenditure during the current year to some £100,000, in addition to cost of mains.

With the regard to the question of water, he might say that the Board were considering new sources of supply. Such plans had to be very carefully thought out, and they had to plan a long way ahead for growth. They would therefore have to make further issues of capital in the near future

Price of Gas.

Turning to the price of gas, a matter which was of great concern to gas administrators at the present time, Mr. Cash pointed out that until now they had been benefiting from coal contracts fixed some time ago. In 1939, however, they would feel the full effect of the increased prices. They were conscious of the remarks of interested parties who observed: "You have got through 1938 very well; so why should there be any more difficulty in 1939?" The answer was, of course, simple—in 1939 they would feel the full effect of the additional price of coal. Another matter was that the coke, tar, and other residuals were difficult to estimate so far as the price they would bring in was concerned. Weighing up all these factors, the Directors had come to the conclusion that the price of gas must be increased in Bournemouth and Poole by 0·4d. per therm. That would bring the price to 8·8d. and would not affect the dividend under the sliding scale. He would also remind consumers that this increase was equivalent to only 5%, whereas the cost of coal was rising by 15%. So he thought it would be agreed that consumers would feel that they had been fairly treated and that the increase was fully justified. The increase would mean, as he had said, 0·4d. in Bournemouth and Poole, 0·2d. in Wimborne, and no increase at all in the differential areas, where a higher price was already being paid.

In conclusion, the Chairman paid tribute to the excellent work of the officers and staff generally during the past twelve months. He then formally moved the resolution for the adoption of the Report and Accounts.

This was seconded by Sir CHARLES MORGAN, C.B.E., M.Inst.C.E., and carried unanimously.

Dividends.

On the proposition of the CHAIRMAN, seconded by Sir CHARLES MORGAN, dividends in respect of the half year ended Dec. 31, 1938, were declared as follows:

On the preference stock at the rate of 6% per annum.

On the maximum dividend stock at the rate of 7% per annum.

On the standard 5% (sliding scale) stock at the rate of 9½% per annum.

Re-Election of Directors and Auditors.

The CHAIRMAN thereafter proposed the re-election to the Board of Sir Charles Morgan and Mr. Ernest E. Bird, being the two Directors retiring by rotation. He referred to Sir Charles as an old friend and very able Director who had helped the Company for many years, and he was glad he was able and willing to go on assisting them. To Mr. Bird he had already referred in his opening remarks.

The resolution was seconded by Sir GEORGE JESSEL, Bart, M.C., and carried unanimously—Sir CHARLES MORGAN and Mr. BIRD briefly returning thanks for their re-election, the latter observing that he was very grateful to the stockholders for confirming his election to the Board and for the kind remarks the Chairman had made. His best efforts would be at the disposal of the Bournemouth Company in connexion with which he had already commenced his education by visiting Bournemouth and inspecting the area under the able guidance of the General Manager.

On the proposition of Mr. J. TAYLOR, seconded by Mr. J. H. MITCHELL, the retiring Auditor, Mr. R. H. Glen, F.C.A.), was re-appointed.

Vote of Thanks.

The CHAIRMAN, in proposing a vote of thanks to the officers and staff of the Company, observed that such a vote had been passed on many occasions, but it was never better deserved than now. In it he included the General Manager, Secretary, officers, staff, and workpeople generally in both Bournemouth and London. He said it was never more fully deserved because they had all had a most trying time, particularly towards the end of the year. He was sure Mr. Moon would confirm that everyone had worked well and loyally during that period, and as to Mr. Moon himself, he did not think that any company had a more capable engineer and manager than he.

Mr. HAROLD G. PALMER seconded the vote, which was carried unanimously.

Acknowledging the vote of thanks, Mr. P. G. G. MOON said he very much appreciated the tribute which had been paid to himself, his colleagues, and all the workers in the Company in regard to their efforts during the past year. He could testify that everyone had served most loyally, efficiently, and well, and they would greatly appreciate the remarks which had been made in proposing the vote of thanks. It would be unfair if he did not refer to another aspect of the same matter—namely, that human nature being what it was, employers received the sort of service they deserved, and the fact that they got good service was because they treated the staff so well. They had made the conditions of employment very happy; they had established through the co-partnership scheme a practical interest in the prosperity of the Company; and they had provided a prospect of security in the future through the pension fund. By these things they deserved good service, and he was quite sure they had received good service.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting immediately followed for the purpose of authorizing the Directors to exercise the powers for the raising of additional capital authorized by the Bournemouth Gas and Water Act, 1938.

The CHAIRMAN, in moving the resolutions, briefly explained their purpose and the immediate intentions of the Board in that respect. Although the total amount authorized appeared large, it did not mean that they intended to issue the whole in the immediate future. The resolutions merely gave the Directors power to issue stock by various means as and when required. So much depended upon the state of the money market at any particular time and what was best in the interests of the Company.

The resolution was seconded by Sir GEORGE JESSEL and unanimously agreed, and the proceedings terminated with a vote of thanks to the Chairman and Directors for their conduct of the Company's affairs during the past year.

Scottish Juniors Visit Coke Oven Plant

Some 25 members of the Scottish Junior Gas Association (Eastern District) took part in a visit to the coke oven plant of W. Dixon, Ltd., at Govanhill, Glasgow, on Feb. 4.

The party was met at the Works by Mr. T. Ritchie (General Manager) and members of his staff. The visitors were assembled and first shown a very interesting display of samples of the raw materials and products made at the works, including the ironworks. The samples were arranged so that alongside the raw material, such as coal, the corresponding yields of coke, tar, benzole, &c., were displayed, providing a very striking exhibit. The raw materials used in the manufacture of pig iron were shown in the same way. Drawings of the coke oven plant were inspected and the lay-out and heating arrangements of the plant explained to the visitors.

The party then proceeded round the coke ovens. This plant, erected by Simon Carves, Ltd., some three years ago, was described in the Technical Press at the time. Gas is the only product for which there is no sale outside the works; it is used for heating the ovens and for heating boilers, &c., also serving as an enricher for the blast furnace gas. In the event of a suitable outlet being found for the gas the ovens are so arranged that blast furnace gas can be used for heating.

The by-product plant includes crude benzole recovery, benzole refinery, sulphate of ammonia recovery, &c. Tar fog is removed by means of an electrostatic de-tarrer.

After the inspection of the works the party was entertained at tea by the Company.

The PRESIDENT (Mr. R. Cowie, Jnr.) said they were much indebted to Messrs. Dixon for the privilege extended to them; and every one of them must have been most impressed by what they had seen that afternoon. He asked Mr. Ritchie to convey their thanks and appreciation to the Directors.

Mr. RITCHIE thanked Mr. Cowie for his remarks and went on to say that they were not at present working the plant to capacity —which was about 950 tons of coal per day. The members might have noticed the seemingly small number of men employed; while this was true it was not due to any desire to economize; the men seen on the plant were all that were required to work it, due to the lay-out and the design. This might not be thought a good point by people concerning themselves with employment of labour; but it had to be born in mind that a plant such as this provided for some hundreds of miners to keep it going in coal, to say nothing of persons employed indirectly on the by-product side.

The members were then conducted to the ironworks where they saw a furnace tapped and the molten metal run into the moulds.

Newcastle-upon-Tyne and Gateshead Gas Company

The Annual Meeting of the Newcastle-upon-Tyne and Gateshead Gas Company was held on Tuesday, Feb. 28, at the Chief Offices of the Company, 30, Grainger Street, Newcastle-upon-Tyne, Sir CECIL A. COCHRANE, M.A., D.C.L., Chairman of Directors, presiding.

The CHAIRMAN, moving the adoption of the Report and Accounts, said: Before proceeding with the ordinary business of the meeting I should like to refer to the great loss the Company has sustained by the deaths of the Chairman and the Deputy-Chairman.

Mr. Cowen presided over the Company for 20 years, during which period its area of supply was greatly enlarged by the absorption of the Walker and Wallsend, Tynemouth, Chester-le-Street, and South Shields Gas Companies; the number of consumers increased from 125,000 to 270,000, and the sale of gas from 4,200 to over 7,000 million cu.ft. per annum; the finances were put upon a sound basis and the Company's position in the gas world was raised to a foremost place. His colleagues held Mr. Cowen in the highest esteem; his natural ability, his sound judgment, his mastery of detail, and his kindness and courtesy to all made him an ideal Chairman. We feel that we have lost a wise leader and a dear friend, and we are assured that our feelings are shared by our Officials and Employees, as well as by the Gas Industry generally.

Mr. Ellis, who died in June last, had been a Director for 25 years, during 19 of which he was Deputy-Chairman. Mr. Ellis took a deep personal and energetic interest in everything concerned with the welfare of the Company, and the Directors desire to express their appreciation of the many important services which he rendered to it.

My colleagues have done me the honour of electing me Chairman of the Company, and I can only say that while I hold that important office I will do my best to guide the Company upon the lines which were followed so successfully by my predecessor.

Colonel Ritson has been appointed Deputy Chairman. He has been a Director for 25 years and has always taken a keen and active interest in the Company's works.

Lord Ridley has been elected a Director. Though still a young man he has already a notable record of public service and we feel confident he will be a most useful member of the Board.

The Accounts.

The Accounts of the South Shields Gas Company are incorporated with the accounts under consideration for the first time, but in any comparisons made with previous years the South Shields figures are taken into account.

Ordinary Stock of the Company to the amount of £368,952 was issued in place of the Consolidated and Ordinary Stocks of the South Shields Gas Company, and on the other side of the account the necessary adjustment has been made.

£250,000 of 3½% Debenture Stock, Redeemable 1958/63, was issued on April 1 last at the price of £97%, and £147,589 of South Shields Mortgage Bonds were paid off, and £1,400 of our 5% Redeemable Stock has been purchased and cancelled, leaving a net receipt of £93,511.

There has been spent during the year £53,521—mostly on mains and appliances. Credits and Depreciation amounting to £29,134 leaves an unspent balance on Capital Account of £54,890. In May next £73,186 of 5% Debenture Stock falls due to be redeemed.

The sale of gas has increased over that sold in 1937 by 1·2%. This is very satisfactory considering the large increases in recent years, the recession in trade, and the mild weather in the Spring and Autumn of 1938. In the spell of very bad weather just before Christmas we again broke the records of the Company in respect of the quantity sold in a day and in a week.

The revenue derived from residuals shows a substantial reduction due to a lesser quantity of coals carbonized and to reduced prices. 1938 has been a poor year for the export of coke with the result that we shall have large stocks to carry forward at the end of the season. It has also been a bad market for tar products.

After allocating £5,000 to the Special Purposes Fund, £15,606 to the Renewal Fund and £27,714 for depreciation, it is proposed to pay dividends at the same rates as have operated for some years viz., 4% per annum on the Preference Stock and £5 7s. 6d.% on the Ordinary Stock. The amount carried forward is reduced by about £11,000.

Due to the unsettled state of Europe, and this being a vulnerable district, we have been asked by the Government to do work which is considered to be essential to enable us to continue the supply of gas in the event of damage to one or other of our works or to the coke ovens supplying us with gas. A large expenditure is involved and the Government is making a grant towards this on a percentage basis. The Company has also to carry out a considerable amount of work for the protection of its employees and plant for which no grant will be received.

Compliance with the new Factory Act also involves additional expenditure by the Company.

Sales Development.

During the year the number of consumers has increased by over 5,000.

The popularity of work-saving and comfort-giving appliances in the form of gas cookers, fires, water heaters, refrigerators, &c., is shown by a net increase in the numbers of major appliances supplied of nearly 40,000 which is higher than the increase of the previous year. At our Annual Sale in October the cash value of the gas appliances sold and hired amounted to over £20,000.

Gas lighting is still a very important part of our business and we have supplied many thousands of lighting appliances to our consumers during the year.

The policy of developing the use of gas for all domestic heating purposes to the entire exclusion of solid fuel from the home has been pursued. Tributes received from our customers who have adopted "all-gas" heating show that a higher standard of comfort, much reduced housework, and added cleanliness are achieved at practically no greater cost to them and I think we ought to have a steady development of this load in the future.

The quantity of gas sold for industrial purposes again shows a substantial increase. Throughout the year the increasing regard for gas as a fuel has been noticeable, and while the re-armament programme has had a decided effect upon this portion of our business, a rapid change-over to gas is taking place in all spheres of industrial heating from the most highly exacting type of work to the most crude form of heat application.

We have in hand orders which will represent an annual increase in gas consumption of more than 100 million cu.ft. per annum.

Reviewing 1938 it is possible to see the effect of the recession in trade which has taken place in certain directions. The international situation during August and September had a delaying effect upon our activities, but since then the volume of orders booked week by week has broken all previous records, and there is reason to anticipate that this very satisfactory state of affairs will continue for some time.

With regard to public lighting, the Whitley & Monkseaton Urban District Council have entrusted to us the lighting of the Promenade. This installation is noteworthy for its high efficiency and it is pleasing to record that gas is now used for the whole of the public lighting. Installations of interest have also been carried out in Gateshead, Longbenton, and Lamesley.

A main has been laid to enable us to supply gas into Jarrow Gas-Works from the Monkton Coke Ovens of John Bowes & Partners, Ltd.

As most of you know, the Directors complained to the Durham Investigation Committee against the price charged for coal by the Sales Committee. The decision of the Investigation Committee was against the Company. As a notice of Appeal to the Central Appeal Tribunal has been lodged nothing further can be said about the matter at the moment.

Price of Gas.

The late Chairman intimated to you at last Annual Meeting that whether any increase in the price of gas would become necessary after 1938 depended to a large extent on whether the cost of coal and the revenue from residuals got too far apart. Since then the price of coals has risen higher and the prices of residuals have fallen further than we anticipated. It therefore becomes necessary for the Directors to give most careful and anxious consideration to the question of the prospects of future income and expenditure and to see what economies, if any, can be made in the general working arrangements of the Company. The Directors greatly desire to avoid increasing the price of gas, because the effect would be to hinder development, but circumstances beyond their control may force them to do so.

With regard to the Staff, you were informed at last Annual Meeting that our Chief Engineer, Mr. Tarratt, was about to retire and that a new Chief Engineer, Mr. Robert Gray, had been appointed. Unfortunately five weeks after Mr. Tarratt retired Mr. Gray died suddenly in London. This was a matter of deep regret to your Directors, for during the short time Mr. Gray had been

with us he had proved himself to be an able Engineer and a delightful personality. To fill the vacancy we obtained the services, as from Dec. 1, of Mr. Edward Crowther, who is with us to-day. Mr. Crowther is a young man with a wide experience, having been in charge of the Gas Undertakings of Bradford and Salford, and latterly Chief Engineer and Manager to the United Kingdom Gas Corporation, Ltd. We have every confidence that he will fully maintain the high traditions associated with the office he holds in our Company. Mr. Crowther has also been appointed Assistant General Manager. Mr. Willis, the Assistant Chief Engineer, acted during the period in which we were without a Chief Engineer to the entire satisfaction of the Board. The services of Mr. Ridley—our General Manager—are too well known to you for me to refer to them at any length, but I must offer him on behalf of the Board, and I am sure of you all, our warm thanks for his devoted work in the interests of the Company and our congratulations on the results obtained in a very difficult year.

Southampton Gaslight and Coke Company

The Annual Ordinary General Meeting of the Company was held on Wednesday, Feb. 22, 1939, at the Central Offices and Showrooms, 66, Above Bar, Southampton, at noon—Sir RUSSELL BENCRAFT, M.R.C.S. (Eng.), J.P. (Chairman), presiding.

The CHAIRMAN, in moving the adoption of the Report and Accounts for the year 1938, said:

I feel that the stockholders will agree with me that the Company has had another very satisfactory year. The increase in the sales of gas was 95,068,200 cu.ft., or 4·51%, and this followed an increase in the previous year of 3·06%. It is satisfactory to note that there was an increase in consumption in the Winchester area of 11,775,900 cu.ft., or 5·42%.

The quantity of gas sold is to a very large extent governed by the average temperature. When one recollects the exceptionally mild weather experienced last March, and also throughout most of the autumn, the increase shown is all the more gratifying.

The cold spell which started on Dec. 18 sent the gas consumption up to an unparalleled extent, and all previous records in output were broken for some days. The maximum demand occurred on Dec. 20, when 9¼ millions cubic feet (three times the capacity of our new gasholder at Northam) was sent out in 24 hours. This was 30% higher than the average output for the first 18 days of December, so it will be appreciated that the huge increase was somewhat embarrassing. The manufacturing plant was working for several days to its full capacity, and the fact that the supply of gas throughout the district was practically unaffected reflects the greatest credit on the engineering staff and employees at both our Works.

The balance carried forward in the Profit and Loss Account, subject to final dividends, has been increased by £5,128 to £64,646, and the Directors recommend the payment of an additional ¼% dividend on the ordinary stock, making the total dividend for the year 5¼%, the same as during the last three years.

The additional dividend and the bonus to the Company's employees, payable under the basic price provisions, amount to £3,752. The final dividends on the ordinary and preference stocks and the bonus to employees will require £28,332, reducing the surplus carried forward in the Profit and Loss Account to £36,314.

Owing to the increase in wages made in September, 1937, the amount available for the payment of the bonus to employees is not quite sufficient to pay at the rate of £1 6s. 8d., or 1⅓% on wages and salaries, as has been done during the past three years, and the distribution will be made at the rate of £1 6s., or 1 3-10%.

Considerable, but unavoidable delay has occurred in the erection of the new static vertical retort plant for which fresh capital was issued in 1937. The installation was completed a short time ago and gas making in the new retorts has commenced. It is anticipated that the new retorts will tend to reduce still further the cost of manufacturing gas. They will certainly prove a most useful addition to the manufacturing plant should an occasion arise, as it did last December, when the demand for gas exceeded all expectations.

The sum of £54,731 has been charged to Capital Account on account of these retorts and the sum of £6,031 has been written off capital and charged to Maintenance of Works and Plant Account in respect of buildings and plant dismantled, principally in connexion with the new plant. The figure of £10,073 for new mains represents the costs of material required for 17 miles of new main laid during the year, the cost of labour, namely, £8,244 being charged to maintenance of mains and services in the Revenue Account.

The increase in the number of consumers for the year was 2,280.

The increase in the cost of coal for the year was £9,245, representing 3,474 tons more carbonized, and an increase in the average price of 9d. per ton. The revenue from residuals has advanced £4,575, of which £2,244 was due to the new benzole plant at Winchester, which was started up in January of last year.

It has been found possible to avoid an increase in the price of gas up to the present, the extra cost of coal and wages being met to a large extent by the additional revenue from residual products and the general increase in the consumption of gas. Coal will cost us still more this year, but it is not anticipated that it will be necessary to increase the price of gas, unless unforeseen circumstances should compel a price revision.

The Sales Department have had another exceedingly busy year, the sales of gas appliances again constituting a record.

Owing to the growth of the Company's business the accommodation at the Central Offices has become very inadequate, particularly in the Rental Department. The present offices were acquired in the year 1924, and the following figures show the necessity for increased accommodation:

—	1924.	1938.	Increase.
Number of consumers	37,235	76,656	39,421, or 105%
Gas consumption, millions ..	1,207	2,204	997, or 82%

In addition, the Company's hire purchase business has made very rapid growth during recent years, the number of appliances (apart from small apparatus such as gas irons, switches, &c.) fixed on extended terms during the last six years, being 52,360, the majority being for a five or seven-year period.

Premises at 166-174, Above Bar, came into the market, and, after prolonged negotiations, a satisfactory settlement was arranged, and agreements were exchanged to acquire these premises, and to dispose of 66, Above Bar.

New offices are now in course of erection, and the conversion of the front portion of the building into modern showrooms has commenced. The first floor of the showrooms will include a demonstration room, with seating accommodation for some 300, in which cookery demonstrations will be given and meetings of the Women's Gas Association will be held.

It is hoped to move the offices and showrooms about next April. The sum of £5,856 has been charged to Revenue Account in respect of the new offices and £60,000 has been left in Suspense Account to be dealt with on the final settlement.

I beg to move that the Report of the Directors and the audited Statement of Accounts for the year ended Dec. 31, 1938, be received, approved, and adopted.

The proposition was seconded by the DEPUTY CHAIRMAN (Brigadier E. M. Jack) and carried unanimously. The retiring Directors, Brigadier E. M. Jack and Mr. F. Woolley, and the retiring Auditors (Messrs. Burnett, Swayne, & Stothert) were unanimously re-elected.

Western Juniors at Birmingham

Demonstration of Spray Welding

A most interesting morning was spent by some of the Works' members of the Western Junior Gas Association on the occasion of the Joint Juniors Visit to Birmingham. A visit was made to Windsor Street Gas-Works by permission of Mr. A. W. Smith, General Manager and Secretary of the City of Birmingham Gas Department.

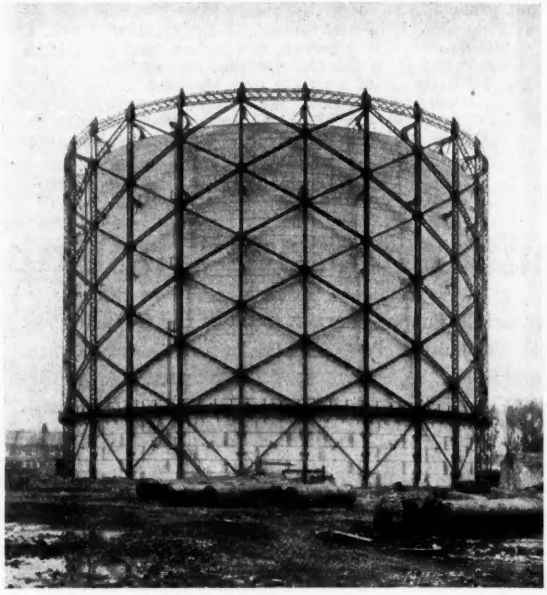
The party were met at the Works by Mr. S. K. Hawthorn and taken to see demonstrations of the spray welding method of patching continuous vertical retorts, which he and his colleagues have developed. Samples of the repairs were exhibited, and a hole "filled" while members of the party were watching; later the repair of a crack in a retort was witnessed.

The thanks of members were expressed by the President (Mr. A. Tran, Reading) to Mr. A. W. Smith for arranging for the party to be conveyed to the Works, and later to the B.I.F., and to Mr. S. K. Hawthorn and his colleagues for the demonstrations.

GASHOLDERS

Guide Framed
Spiral
Waterless
Inspection & Repairs

GASWORKS PLANT AND
STRUCTURAL STEELWORK



SAML. CUTLER & SONS, LTD.

39, VICTORIA STREET, LONDON, S.W. 1.
Telephone: ABBEY 3121 Telegrams: RETORTUS, SOWEST, LONDON

Telephone: EAST 5231 Providence Iron Works, Millwall, London, E.14. Telegrams: CUTLER, MILLWALL, LONDON

467

AT BOURNEMOUTH—CAPACITY 5 MILLION CUBIC FEET.

C. & W. WALKER, LTD.

DONNINGTON,
Nr. WELLINGTON—SHROPS.
'Phone: Lilleshall-Shropshire Nos. 34 & 35 (2 lines)
'Grams: "Fortress," Donnington, Shropshire

ARE
MAKERS OF
THE
LARGEST SPIRAL
HOLDER
IN A STEEL TANK
IN THE WORLD.

THE
LARGEST WORKING
GUIDEFRAMED
HOLDER
CONSTRUCTED
IN THIS COUNTRY.

GASHOLDERS RIVETED OR ELECTRICALLY WELDED.

London Office - - - 70, VICTORIA STREET, WESTMINSTER, S.W.1.
'Phone: Victoria No. 1941 'Grams: "Fortress," Sowest, London

Hornsey Gas Company

The Annual Ordinary General Meeting of the Proprietors of the Hornsey Gas Company was held at 5, Great Winchester Street, Old Broad Street, E.C., on Friday, Feb. 24, 1939—Mr. A. M. PADDON, M.Inst.C.E. (Chairman of the Company), presiding.

The GENERAL MANAGER AND SECRETARY (Mr. K. Leslie Mortimore, A.C.A.) read the notice convening the meeting.

THE CHAIRMAN'S ADDRESS.

Satisfactory Year's Working.

The CHAIRMAN, moving the adoption of the Directors' Report and Statement of Accounts for the year ended Dec. 31, 1938 (which were taken as read), made reference first to the fact that, as stated in the Report, Mr. Ernest Lionel Burton had retired from the Board. Mr. Burton's exceptional knowledge and long experience of the Gas Industry, he said, had been of the greatest possible value to his colleagues in the Company, and they very much regretted having lost his co-operation. They hoped sincerely that he would enjoy his retirement. They had been fortunate, however, in being able to appoint, to fill the vacancy on the Board, Mr. Hyde Clarke Burton, F.C.A., who had previously served the Company as an Auditor; he also had exceptional qualifications, and the considerable advantage of conversancy with the Company's accounts in the past.

Discussing the distribution of profits, the Chairman said he was sure the proprietors would be gratified, as were the Directors, that they had been able to recommend the restoration of the full former rate of dividend, which they had been compelled by certain circumstances temporarily to reduce in the first half-year. The Directors had been able to do that by having obtained an increase in the standard price of gas, for which they had reason to thank the Hornsey Borough Council, which had shown the Company great courtesy and consideration.

The Report indicated that there was a decrease in the sale of gas of 5·6% in 1938 as compared with 1937, and he was sorry to have to say that that was a general complaint in the Gas Industry. Leaving out of account for the moment the exceptional period of arctic weather which had occurred at the end of 1938, the whole year was distinctly unfavourable to gas undertakings from the climatic point of view; there were two whole months, March and November, in which temperatures were so high as to affect seriously the use of fuel of any description, including gas. Taking that into consideration, he did not think there was anything to alarm the Company. The Company's area was strictly limited; it was confined to the parish of Hornsey, and did not cover even the whole of that parish, for part of it was supplied by the Gas Light and Coke Company. Therefore, there was very little in the way of new building or new development upon which the Company could count in the future, and they were driven back to what might be called the intensive development of the use of gas by the multifarious implements which had been introduced day by day. They had to create new business with their consumers, with much of which those consumers had not been familar in the past and to which it was the Company's duty to introduce them. That was probably expensive, but it did promise the Company's ability to maintain the output of gas even if they could not expand or increase it.

Coming to the accounts, he said the first statement of capital merely indicated the Company's existing powers to issue further capital; and even if the Company had not powers to issue further capital, such powers were not difficult to obtain nowadays. Capital powers had represented a very anxious matter 50 years ago, because in order to obtain such powers the Company, in common with other gas companies, had had to have recourse to Parliament, which was an expensive and precarious process. Nowadays, however, facilities for acquiring further capital powers were numerous and simple.

Capital Expenditure.

Capital Account "C" showed that during 1938 the Company had expended £20,731 of capital. The proprietors might naturally ask why, in view of the decreased output of gas, such capital expenditure was necessary, particularly as the major amount was expended on the retort house. But the fact was that the Company had to accommodate its works policy to market conditions, and in certain circumstances it was necessary to produce a preponderating amount—a disproportionate amount—of coal gas when coal gas offered economic advantages as contrasted with water gas. The retort house power had been somewhat behind, and therefore the money had been spent to improve a profit-earning method of manufacture.

There was also a considerable expenditure on meters, and that was associated with the extended use of gas by individual consumers. It was of no use, of course, trying to promote the sale of apparatus if both the service and the meter were not adequate to take the added demand for gas; and the meters had frequently to be replaced when they were still very far short of their normal term of use because they were inadequate and inapplicable to the new conditions of supply.

But the item of capital expenditure for the year had been reduced by £10,700, by deductions in respect of depreciation, &c.; therefore the Company had obtained those more or less permanent assets at something like half their cost, in so far as they constituted a permanent demand on the Company's finances.

Discussing the revenue account, the Chairman said that the cost of coal, oil, and coke carbonized was slightly less in 1938 than in 1937, of course, because less gas was made in 1938. Cost of repairs and maintenance of works showed a reduced figure, but that must be taken into consideration with the fact, recorded in the account, that the Company had had recourse to the Renewal Fund to the extent of £8,325. The account also showed that £2,500 had been contributed to the Renewal Fund in 1938, however, which reduced the previous figure considerably, and the total figure standing to the debit of that item was less by £2,860 than it was before.

The expenditure on mains had been reduced by £1,215—and the Company could well afford to do that, having regard to the excellent condition of the mains. The expenditure on meters was £682 more, and the expenditure on stoves and fittings was £287 less.

With regard to the contribution of more than £4,000 to the Superannuation and Pensions Fund, the Chairman said that it was a contributory fund and the Company had still certain contributions to make, both of the regular order and of the exceptional and abnormal order, to dissipate the insolvency of the fund. But the position was not unfavourable as compared with that in other companies, because in another ten years, if the Company continued its contributions as in the past, it would not need to incur further those heavy revenue and net revenue charges.

As to the credit side of the account, there was a meagre surplus of £24 as compared with the previous year in respect of the four items under "Sale of Gas"—private consumers and sundry processes, public lighting, rental of meters, and rental of stoves, fittings, &c. The income from the sale of residual products was £1,848 more than in 1937, and miscellaneous receipts had increased by £402.

Thus, the revenue account showed that receipts had increased by £2,274 and expenditure had decreased by £2,764; consequently, profit was increased by £5,038, which, he felt sure the proprietors would agree, was very satisfactory in the circumstances.

Profit and Loss Account.

Dealing with the Profit and Loss Account (net revenue), the Chairman drew attention to the Special contribution of £4,000 to the Co-partners' Contributory Pensions Fund, and said that the main result of that was to reduce the carry forward by £950. The actual reduction was something like £630 from the revenue account; but the increase of the standard price had allowed the Company, for the first time for very many years, to make a small contribution to the Reserve Fund, which the Board had always been anxious to enlarge. That contribution was £316, although it was not shown in the account because it required the sanction of the proprietors at the meeting; but it was only when that amount was included that the carry-forward was reduced by £950. Whereas in 1937 the carry-forward was £15,685, in 1938 the Company carried forward the still comfortable balance of £14,736, which was satisfactory.

With regard to the expenditure on works, the Chairman assured the meeting that the works showed a very much higher standard of efficiency at the end of 1938 than they had a year previously—although they had been very good a year previously. One of the holders had been reconstructed, the cost having been debited to the account, and the Company had very much improved the economic relation of its carbonizing plant to the rest of the manufacture—two accomplishments which should have their effect in the next year's accounts.

While £8,325 had been taken out of the Renewal Fund, mainly on account of the expenditure on the holder, there had been added to the fund the sum of £2,500—which, incidentally, was £1,500 more than the contribution made in the previous year. The Renewal Fund Account still carried forward a balance of

more than £15,000. The Account was really a floating balance in order to equalize the disparities from time to time in the Revenue Account, and therefore there was nothing inappropriate in the Company availing itself of that money.

The note at the bottom of the debit side of the Balance-Sheet showed that the Co-Partnership Fund amounted to nearly £30,000—a very gratifying amount. He had often referred to the value of co-partnership, and it had come to be regarded as a matter of course; but its value would be best appreciated if the Company were suddenly to be without it, for then the Company would realize the difficulties and liabilities which it was spared by its creation and its maintenance in its present condition. The Co-partners' Contributory Pensions Fund amounted to more than £64,000, and if contributions were maintained at the present rate the Fund would be perfectly solvent. In estimating that, an Actuary assumed the Fund to be something quite apart from the finances of the Company, and therefore would put it on a common basis with the ordinary insurance companies, which were, of course, to a certain extent speculative ventures depending on their own finance. But the reliability and dependability of the Contributory Pensions Fund must be immensely increased when it was ancillary to a larger system of finance such as that of the Company, although it was treated independently, as he believed to be right.

With regard to the Company's investments, the amount invested from the Reserve Fund and Special Purposes Fund amounted to a book value of £23,162, whereas their value at Dec. 31, 1938, was £30,674. Such a recorded premium was gratifying.

Future Prospects.

The prospects of the Gas Industry generally, the Chairman said, were difficult because of the increased price of coal. The Company had not met that increase entirely in the 1938 accounts, so that it was still a prospective charge, and a very formidable one. But the Company had increased the price of gas. The 1937 accounts were based on the sale of gas at 8d. per therm, which was the lowest price in the Metropolis. But it was impossible to continue indefinitely to meet the increased costs of wages and coal and all the other demands made on the Company when selling gas at 8d.; therefore, the price was raised to 8·6d. per therm so far as the 1938 accounts were concerned. The price had since been increased by a further 0·4d. to meet the current year's expenses. But even when the price was increased thereby to 9d., the Hornsey Company would still be selling gas at the lowest rate in the Metropolitan area. While preserving that exceptional position, the Company had at the same time made every reasonable provision to meet its prospective difficulties. He hoped the proprietors would think that that was very satisfactory. The last increase in price would still allow the full former rate of dividend to be paid.

The Chairman proposed that the Report and Statement of Accounts be received, adopted, and entered on the Minutes.

Mr. G. W. CAREY (Deputy-Chairman) seconded.

(There was no response to the Chairman's invitation to the proprietors to discuss the Report and Accounts or to ask questions; and the resolution for their adoption was carried.)

Dividends.

On the motion of the CHAIRMAN, seconded by Mr. CAREY, dividends for the half-year ended Dec. 31, 1938 (being the final dividends for the year) were declared as follows:

On the 5% Preference Stock, £5% per annum;
On the 5% Stock, £7 10s.% per annum; and
On the 3½% Stock, £6% per annum;

all less Income-Tax; (making, with the interim dividends already paid on the 5% Stock and 3½% Stock respectively, £7$\frac{5}{14}$% and £5$\frac{13}{14}$% for the year); that such final dividends be paid on Wednesday, March 1, proximo, and that the sum of £316 10s. be transferred to the Reserve Fund.

Re-Election of Directors and Auditors.

Mr. J. W. BUCKLEY, M.Inst.C.E., proposing the re-election of the retiring Directors, Mr. A. M. Paddon and Mr. G. W. Carey, said it was a privilege to do so, because he had had the pleasure of working with them for many years; he had worked with Mr. Paddon for 30 years, and it had also been his pleasure to have been connected with the Company during the whole period Mr. Carey had been a Director. He was quite sure that it was absolutely impossible to find anybody more worthy than Mr. Paddon of holding the highest position in the Company. The Company, and especially co-partnership, owed a great deal to him.

The resolution was seconded by Mr. HYDE C. BURTON, and carried unanimously. Both Mr. PADDON and Mr. CAREY briefly responded.

On the motion of Mr. K. R. MACKAY, seconded by Mr. F. J. BRADFIELD, the meeting unanimously elected Mr. G. M. BURTON and Mr. W. B. PATON Auditors of the Company.

Votes of Thanks.

The CHAIRMAN, moving a vote of thanks to the officers, staff, and all the servants of the Company, emphasized that the past year had not been an easy one for them; there was a good deal of disappointment in respect of climatic conditions, and there was a sort of Doxology at about Christmas time, when the weather was very severe and the Company and its servants had had something else to do than to sing carols! But the staff had met the conditions very well indeed, and had not disappointed anybody; pressures were maintained, and he believed the supply had given every satisfaction. He wished he could say the same of every other gas undertaking of which he had knowledge, although the difficulties were greater in those other cases. However, he was sure the proprietors would wish to thank the officers and all concerned for their loyalty, for they had been mainly responsible for whatever satisfaction the Company's report had given.

Mr. J. W. BUCKLEY, seconding, said that, having been an official of the Company, he could say without hesitation that it was very well served indeed by the Chief Officials, and he was sure the Company could not better them even if it wanted to do so. He had reason to believe also that the workmen were a very loyal lot of fellows. Offering his meed of praise to the Co-partnership Committee, he said that he presided throughout the whole period of the Committee meetings, with few exceptions, and he was gratified by the excellent attendances and the fact that the members of the Committee gave the Chairman very little trouble. It was a pleasure to work with them, and he hoped that pleasure would be continued for many years.

(The vote of thanks was accorded with enthusiasm.)

Mr. K. LESLIE MORTIMORE, A.C.A. (General Manager and Secretary), responding, said he would be happy to convey to the staff the pleasing remarks that had been made with regard to their work; he was quite sure that those remarks would spur them on to still greater efforts in the future.

Mr. C. C. V. GANDON (Engineer and District Superintendent) also responded and expressed thanks on behalf of himself and all who were working under his direction

Captain H. F. WILKINSON, R.E., M.Inst.C.E., proposing a hearty vote of thanks to the Chairman and Directors for their able management of the Company's affairs during last year, said the year had been very difficult for all gas companies, and one could quite understand the even more difficult position of the Hornsey Company, supplying in an area which was not capable of expansion. The whole Industry was faced with a very difficult position with regard to coal, and the Hornsey Company had done very well in face of that difficulty. Great credit was due to the Chairman and his co-Directors for their work.

The resolution was seconded by Mr. K. R. MACKAY, and carried unanimously.

The CHAIRMAN briefly responded, and the meeting closed.

Scale Prevention

The deposition of scale in condensers and cooling systems of all kinds, caused by the presence of calcium bicarbonate in cooling water, is frequently a source of trouble and expense. Messrs. Keith Piercy, Ltd., of Shell-Mex House, Strand, W.C.2, one showing some interesting experiments illustrating the action of "Calgon" in preventing this deposition on the stand of their Associated Company, Messrs. Albright and Wilson, Ltd., at the Olympia Section of the B.I.F.

A method of preventing deposition of scale, state Messrs. Keith Piercy, Ltd., is provided by the use of sodium metaphosphate, which, under the trade name of "Calgon," has established itself in America and Great Britain as a valuable and versatile agent in many branches of industrial water treatment and boiler feed water conditioning. The new method—known as "Threshold Treatment" from the fact that it raises the threshold concentration at which calcium carbonate will precipitate and form scale—consists essentially in the addition of sodium metaphosphate in extremely small quantities of the order of 0·5 to 2 parts per million. Only one or two pounds of the chemical, therefore, would be required for the treatment of 100,000 gallons of water, so that the cost of treatment is remarkably low. It has already been applied successfully. The method is extremely simple to apply, chemical addition being effected by drip feeding a solution at some convenient point.

Markets and Manufactures

Current Sales of Gas Products

The London Market

Feb. 27.

Prices of Tar Products generally remain unchanged, to-day's values being as follows:

Pitch, nominal, at about 28s. per ton f.o.b.
Creosote, about 3½d. to 3¾d.
Refined tar, 3¾d.
Pure toluole, about 2s. 3d.
Pure benzole, about 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 10s.
All per gallon naked at makers' works.

The Provinces

Feb. 27.

Crude Gas-Works Tar, 12s. to 17s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 29s. to 30s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 29s. to 30s.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4¼d. to 1s. 5d. Heavy naphtha, North, 1s. 2¼d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3¾d. to 4¼d.; low gravity, 4d. to 4¼d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4¼d. to 4¾d. per minimum 40% purely nominal; "B" quality unsaleable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5¾d.; heavy tar oil, gr. less than 1,080, 4¼d. to 4¾d.

*** All prices for pitch are now quoted on the basis o f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the oils whatever they may be.**

Scotland

GLASGOW, *Feb.* 25.

No change can be recorded in market conditions during the week. Prices of most products remain unstable.

Crude gas-works tar.—Actual value is now about 33s. to 34s. per ton *ex* works in bulk.

Pitch of vertical quality is readily obtainable at 21s. to 22s. per ton f.o.b. for export and round 20s. per ton *ex* works in bulk for home trade.

Refined tar.—Numerous schedules are now being issued for home business with makers' prices fixed at 3¾d. to 4d. per gallon. Export business is difficult, with quotations round 2¾d. to 3d. per gallon, both into buyers' packages at makers' works.

Creosote oil is unstable, and, at present, supplies can be secured as under: Specification oil, 3¾d. to 4d. per gallon; low-gravity, 4¼d. to 4½d. per gallon; neutral oil, 3¾d. to 4d. per gallon; all *ex* works in bulk.

Cresylic acid.—Demand continues very unsatisfactory and prices are nominal, as under: Pale, 97/99%, 1s. 2d. to 1s. 3d. per gallon; dark, 97/99%, 1s. to 1s. 1d. per gallon; pale, 99/100%, 1s. 4d. to 1s. 7d. per gallon; all *ex* works in buyers' packages.

Crude naphtha is unchanged at 5½d. to 6d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 3½d. to 1s. 4d. per gallon and 90/190 heavy naphtha is round 1s. 1d. to 1s. 1½d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—90/160 grade is 8s. 6d. to 9s. 6d. per gallon and 90/140 grade is 9s. 6d. to 10s. 6d. per gallon.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole..	0 9½	to	0 10	per gall. at works
Motor " ..	1 3	"	1 3½	" " "
90% " ..	1 4	"	1 4½	" " "
Pure " ..	1 8	"	1 8½	" "

Contracts Advertised To-Day

Ammonia and Tar Extraction Plant.
Shipley Gas Department. [p. 606.]

Cookers, Fires, and Wash Boilers.
Workington Gas Department. [p. 606.]

Crude Benzole Recovery Plant.
Darwen Gas Department. [p. 605.]

Exhauster.
Penrith Gas Department. [p. 606.]

Gasholder.
Leeds Gas Department. [p. 605.]
Penrith Gas Department. [p. 606.]

Gasholder Repairs.
Manchester Gas Department. [p. 605.]

Mainlaying.
Spenborough Gas Department. [p. 606.]

Meters.
Workington Gas Department. [p. 606.]

Oxide, New and Spent.
Leeds Gas Department. [p. 605.]

Pipes and Specials.
Spenborough Gas Department. [p. 606.]
Workington Gas Department. [p. 606.]

Retorts.
Penrith Gas Department. [p. 606.]

Steam Boiler.
Penrith Gas Department. [p. 606.]

Stores.
Workington Gas Department. [p. 606.]

Valves, Rack, and Pinion.
Leeds Gas Department. [p. 605.]

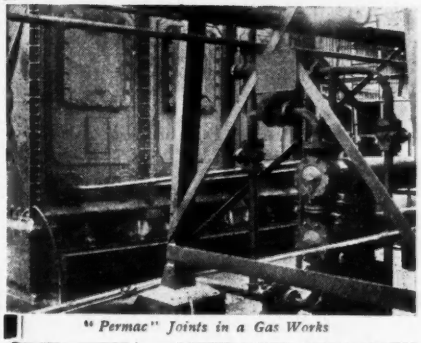
Dividend Announcement

Altrincham Gas Company.—A dividend of 4⅝% on the Original Shares, and 3% on the New Shares of the Company, were paid on Feb. 21, making, with the Interim Dividend paid in August, 1938, 9¼% and 7%, respectively, for the year ended Dec. 31, 1938.

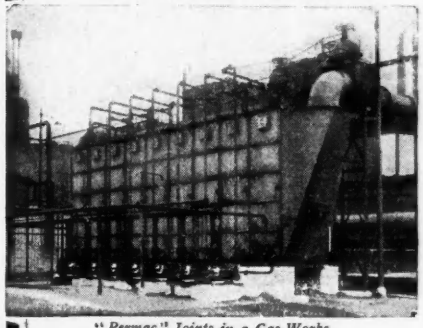
There's only one

Permac!

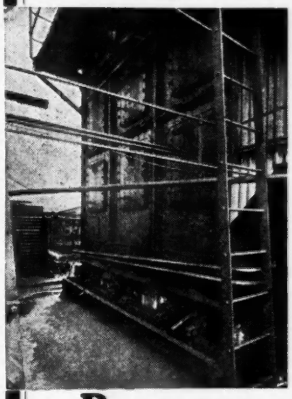
METAL-TO-METAL JOINTING MATERIAL.



"Permac" Joints in a Gas Works



"Permac" Joints in a Gas Works.



"Permac" Joints in a Gas Works.

Be sure you get it!

Here is a selection of "Permac" joints photographed in various Gas Works. "Permac," the Metal-to-Metal Jointing, has been holding up difficult joints like these for over 25 years. Send for particulars.

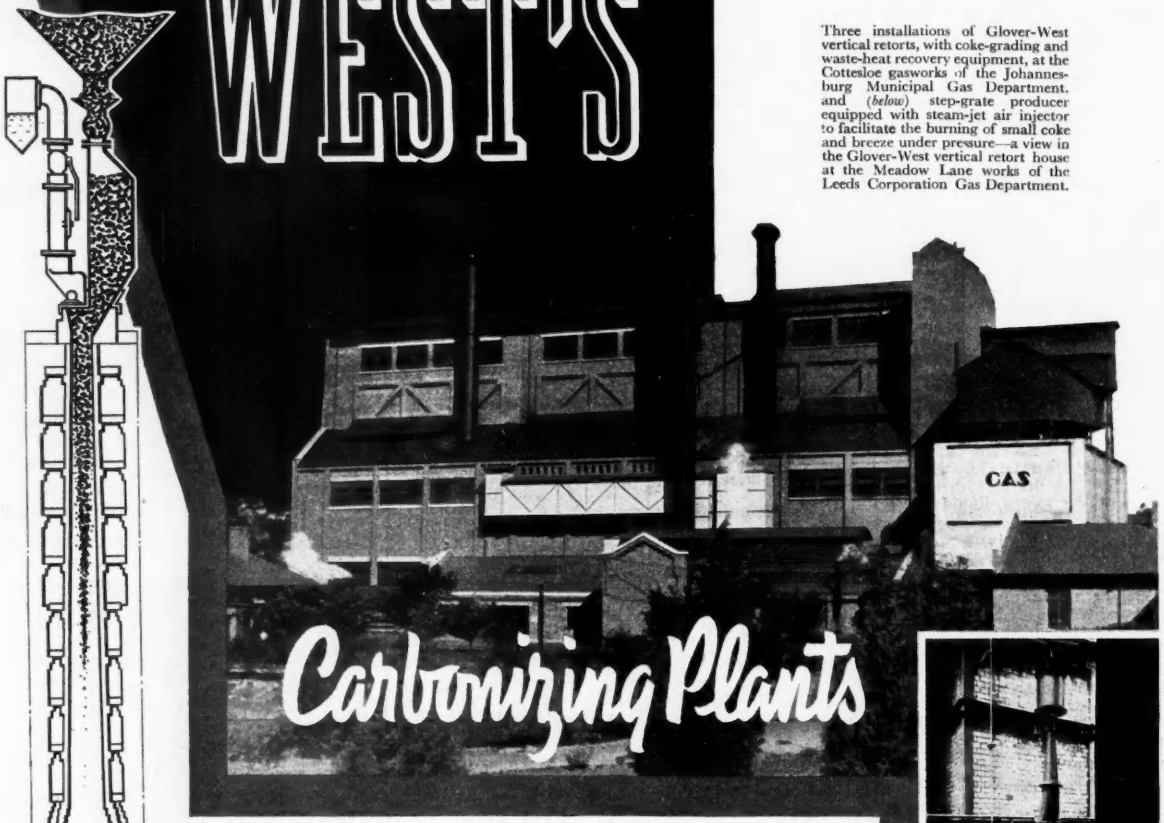
Sole Manufacturers:

THOMAS & BISHOP LTD.
37, Tabernacle St.
LONDON, E.C. 2

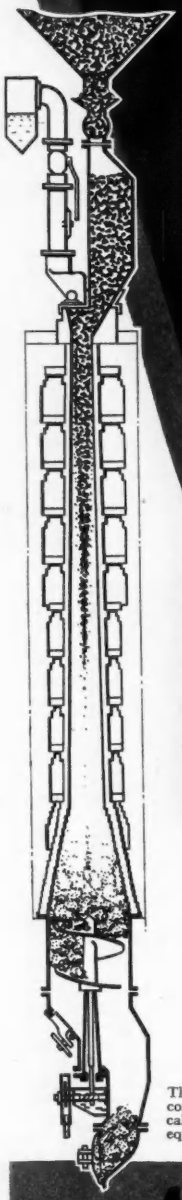
Telephone: Clerkenwell 3351 (2 lines)

WEST'S

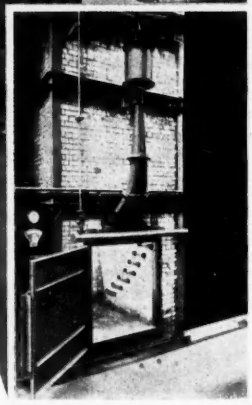
Three installations of Glover-West vertical retorts, with coke-grading and waste-heat recovery equipment, at the Cottesloe gasworks of the Johannesburg Municipal Gas Department, and *(below)* step-grate producer equipped with steam-jet air injector to facilitate the burning of small coke and breeze under pressure—a view in the Glover-West vertical retort house at the Meadow Lane works of the Leeds Corporation Gas Department.



Carbonizing Plants



The Glover-West continuous vertical retort and equipment.



- Increased capacity in relation to ground area covered.
- Output readily adjustable to meet fluctuating demands.
- High yields of gas and coke with low maintenance costs.
- Clean working conditions within the retort house.
- Modern building design and smokeless operation.

WEST'S GAS IMPROVEMENT COMPANY, LTD.
MILES PLATTING, MANCHESTER 10 & COLUMBIA HOUSE, ALDWYCH, W.C.2

Glover-West Vertical Retorts
AND WESTVERTICAL CARBONIZING CHAMBERS

434 PLANTS BUILT OR ORDERED IN 24 COUNTRIES

GAS STOCKS AND SHARES

Sir John Simon's statement that the additional money needed for defence measures would be procured by loan instead of from taxation gave a much-needed stimulus to Stock Exchange affairs last week, and although the volume of business by no means reached normal proportions there were definite signs of revival in many directions. Gilt-edged stocks remained quiet until the success of the Essex loan became known, after which prices began to move up. Considerably more interest was displayed in home rails on the improving tendency of traffic returns and some useful rises were recorded, especially among the preferences. Cheerful conditions prevailed in the industrial section and a number of shares closed appreciably higher than a week ago. Oil shares were firm and although business in rubbers remained quiet prices were well maintained.

Business in gas stocks and shares was also a little heavier last week, but this unfortunately did not prevent a depreciation in the values of a number of leading stocks. With few exceptions the falls were not of a serious nature, though in the case of the Commercial the set-back is due to the reduction in the dividend last year from 5% to 4½%, while as regards the Wandsworth stock, which has lost 10 points during the past fortnight, the fall is brought about by the drop of ½% to 6½% in the dividend for the current year by reason of the increase in the price of gas to take effect from April 1. The depreciations were practically confined to the London Exchange as apart from *ex div.* markings values at the Provincial Exchanges closed unchanged.

A list was given in last week's Report showing the parcels of ordinary stocks on offer at that time and there has since become available a parcel of £2,500 Commercial ordinary at 67 to yield £6 14s. 6d. on last year's dividend. This is the highest yield now obtainable on any ordinary gas stock available of an undertaking in this country, and having regard to the confidence in the Company's future expressed by Mr. Frank H. Jones at the annual meeting (reported in last week's "JOURNAL") a holding at the current price should turn out a satisfactory investment.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
1,767,439	Sept. 5	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	Dec. 19	4	4	Do. 4 p.c. Deb. ...	93—98	...
734,733	Nov. 7	5	5	Asscd. Gas & Water U'd'ts Ord.	17/—19/—	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/—	...
444,389	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/—	...
296,523	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	16/—18/—	...
500,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
560,070	Feb. 20	7	7	Barnet Ord. 7 p.c.	155—160*	−2½
300,000	Oct. 10	1/9⅔	1/4⅔	Bombay, Ltd.	22/6—24/6	...
180,435	Feb. 20	9½	9½	Bournemouth sliding scale ...	192—202*	−3
690,526	,,	7	7	Do. 7 p.c. max. ...	155—160*	−2
493,960	,,	6	6	Do. 6 p.c. Pref. ...	128—133*	−2
50,000	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...
362,025	,,	4	4	Do. 4 p.c. Deb. ...	95—100	−1
335,000	,,	5	5	Do. 5 p.c. Deb. ...	113—118	...
357,900	Feb. 20	7½	7½	Brighton, &c., 6 p.c. Con. ...	141—146*	−2
659,955	,,	6½	6½	Do. 5 p.c. Con. ...	124—129*	−2
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	125—130*	−2
655,000	Sept. 19	8	7	British Ord.	133—137	...
100,000	Dec. 19	7	7	Do. 7 p.c. Pref.	138—143	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	112—117	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	55—100	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
100,000	22 May '33	6	4	Cape Town, Ltd.	1—2	...
100,000	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1—2	...
150,000	Dec. 19	4½	4½	Do. 4½ p.c. Deb. ...	60—70	...
626,860	Feb. 6	6	6	Cardiff Con. Ord.	116—121	...
237,860	Dec. 19	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...
98,936	Sept. 19	2/—	2/—	Colombo Ord.	1½—1⅝	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	22/6—24/6	...
739,453	Oct. 10	−/11·48	−/11·48	Colonial Gas Assn. Ltd. Ord.	16/6—18/6	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref. ...	23/6—25/6	...
1,775,005	Jan. 23	5	4	Commercial Ord.	60—70	−7½
140,000	Feb. 6	§13/4	4	Do. 4 p.c. Red. Pref. ...	95—100	...
620,000	Dec. 5	3	3	Do. 3 p.c. Deb. ...	66—71	−4
286,344	Feb. 20	5	5	Do. 5 p.c. Deb. ...	110—115*	−2
200,000	,,	4⅔	4	Do. 3⅔ p.c. Red. Deb. ...	95—100*	−2
807,560	Feb. 20	7	7	Croydon sliding scale ...	133—138*	−2
644,590	,,	5	5	Do. max. div.	98—103*	−2
620,385	Dec. 19	5	5	Do. 5 p.c. Deb. ...	112—117	...
239,000	Feb. 6	5	5	East Hull Ord. 5 p.c. ...	93—98	...
186,155	Feb. 6	6	6	East Surrey Ord. 5 p.c. ...	113—118	...
176,211	Dec. 5	5	5	Do. 5 p.c. Deb ...	112—117	...
250,000	Nov. 7	8	4	Gas Consolidation Ord. 'B' ...	19/—21/—	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6	...
19,189,963	Feb. 6	5⅔	5⅔	Gas Light & Coke Ord. ...	20/9—21/9a	−−/3
2,600,000	,,	3½	3½	Do. 3½ p.c. max. ...	72—77*	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	92—97*	...
2,993,000	Jan. 9	3⅔	3⅔	Do. 3⅔ p.c. Red. Pref. ...	93—98	...
8,602,497	Nov. 21	3	3	Do. 3 p.c. Con. Deb. ...	72—77	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	108—112	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	106—110	−1
700,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
270,466	Feb. 20	6	6	Harrogate New Cons. ...	115—120*	−2
157,500	Mar. 21	1/2⅔	‡1/—	Hong Kong and China Ord. ...	⅞—1	...
213,200	Feb. 6	5⅝	6	Hornsey Con. 3½ p.c. ...	97—102	...
5,600,000	Oct. 24	12	8	Imperial Continental Cap. ...	117—122	...
172,810	Jan. 23	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—101	...
235,242	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...
63,480	Dec. 19	3	3	Maidstone 3 p.c. Deb. ...	68—73	−1
45,000	Nov. 21	†10	†10	Malta & Mediterranean Metropolitan (of Melbourne)	130—135	...
392,000	Oct. 3	5½	5½	5½ p.c. Red. Deb.	100—105	...
231,977	Feb. 20	5	5	M.S. Utility 'C' Cons. ...	96—101*	−2
968,658	,,	4	4	Do. 4 p.c. Cons. Pref. ...	91—96*	−2
390,076	Dec. 19	4	4	M.S. Utility 4 p.c. Deb. ...	93—98	−2
148,955	,,	5	5	Do. 5 p.c. Deb. ...	112—117	...
125,000	Jan. 3	3½	3½	Do. 3½ p.c. Red. Bds.	94—97	...
675,000	Nov. 21	†6	†6	Montevideo, Ltd.	70—75	...
250,000	Aug. 8	7½	7½	North Middlesex 6 p.c. Con.	142—147	...
396,160	Feb. 6	5	5	Northampton 5 p.c. max. ...	105—110	+1
300,000	Oct. 24	†7	†9	Oriental, Ltd.	145—150	...
468,537	Dec. 5	8	7½	Plymouth & Stonehouse 5 p.c.	130—140	...
621,667	Feb. 20	8½	8½	Portsmouth & Gosport Cons.	154—159*	−3
241,446	,,	5	5	Do. 5 p.c. max. ...	98—103*	−2
73,350	,,	5	5	Do. 5 p.c. Pref. ...	105—110*	−2
75,000	,,	4	4	Do. 4 p.c. Pref. ...	88—93*	−2
114,000	Feb. 6	5	5	Preston 5 p.c. Pref.	105—110	...
247,966	Dec. 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	96—101	...
625,959	Jan. 9	4	4	Do. 4 p.c. Red. Deb. ...	94—99	...
15,000	Sept. 5	6	6	San Paulo 6 p.c. Cum. Pref. ...	8½—9	...
441,275	Sept. 19	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	20/6—22/6	...
460,810	Sept. 19	−/10½	−/10½	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
133,201	Aug. 22	5	8½	Shrewsbury 5 p.c. Ord. ...	143—148	...
9,000	June 3	4	‡4	South African Ord.	4½—5½	...
1,371,752	Aug. 22	1/2⅔	1/2⅔	South East'n Gas Cn. Ld. Ord.	21/6—23/6	...
871,636	,,	−/10½	−/10½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/—	...
498,818	,,	4	4	Do. 4 p.c. Cum. Pref. ...	17/—19/—	...
450,000	Feb. 6	4	4	Do. 4 p.c. Deb.	96—101	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
6,709,895	Feb. 6	5	6	South Met. Ord.	98—102	−1½
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	125—130	−1
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	92—97*	...
1,895,445	Dec. 19	3	3	Do. 3 p.c. Deb.	72—77	...
1,000,000	Jan. 9	5	5	Do. 5 p.c. Red. Deb. ...	107—110	...
600,000	,,	§31/—	3½	Do. 3½ p.c. Red. Deb. ...	98—101	...
1,543,795	Jan. 23	6	6	South Suburban Ord. 5 p.c. ...	110—115	...
512,825	,,	5	5	Do. 5 p.c. Pref.	105—110	...
500,000	,,	4	4	Do. 4 p.c. Pref.	92—97	...
250,000	,,	3½	3½	Do. 3½ p.c. Red. Pref. ...	91—96	...
888,587	Dec. 5	5	5	Do. 5 p.c. Deb.	111—116	−1
250,000	,,	4	4	Do. 4 p.c. Deb.	93—98	−2
200,000	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
427,859	Sept. 19	8½	9⅔	S. Western Gas & Water Ord.	16/—18/—	...
160,523	Oct. 10	−/10½	−/10½	Do. 4½ p.c. Red. Cum. Pf.	19/—21/—	...
110,000	Dec. 19	4	4	Do. 4 p.c. Red. Deb. ...	93—98	...
750,541	Feb. 6	5	5½	Southampton Ord. 5 p.c. ...	104—109	...
148,836	Dec. 19	4	4	Do. 4 p.c. Deb.	93—98	...
350,000	Feb. 6	5½	5½	Swansea 5½ p.c. Red. Pref. ...	105—110	...
200,000	Dec. 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
1,076,490	Feb. 20	6⅔	6⅔	Tottenham and District Ord.	123—128*	−3
409,835	,,	5½	5½	Do. 5½ p.c. Pref.	114—119*	−2
62,235	,,	5	5	Do. 5 p.c. Pref.	105—110*	−2
334,615	Dec. 5	4	4	Do. 4 p.c. Deb.	93—98	−2
85,701	Jan. 9	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100	...
1,131,550	Aug. 22	6	4	U. Kingdom Gas Cor. Ord. ...	18/—19/—	...
1,051,280	Nov. 7	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	19/—21/—	...
762,241	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/—	...
745,263	Dec. 19	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	15/6—17/6	...
1,066,186	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...
375,689	Aug. 8	7	7	Uxbridge, &c., 5 p.c.	125—130	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	105—110	−3
1,371,138	Jan. 23	7	7	Wandsworth Consolidated ...	122—127	−5½
2,525,768	,,	4	4	Do. 4 p.c. Pref.	90—95	−2
1,343,964	Dec. 19	5	5	Do. 5 p.c. Deb.	111—116	−1
383,745	,,	4	4	Do. 4 p.c. Deb.	93—98	−2
400,000	,,	§25/—	3⅔	Do. 3⅔ p.c. Red. Deb. ...	96—101	...
558,342	Feb. 6	6⅔	6⅔	Watford and St. Albans Ord.	127—132	−1
200,000	,,	5	5	Do. 5 p.c. Pref. ...	105—110	−1
200,000	,,	5½	5½	Do. 5½ p.c. Pref. ...	112—117*	...
200,000	,,	§16/8	4	Do. 4 p.c. Red. Pref. ...	95—100	...
200,000	Dec. 19	4	4	Do. 4 p.c. Red. Deb. ...	93—98	−2
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...

a.—The quoration is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Feb. 24.	Rise or Fall on Week.
202,152	Sept. 5	5	5	Ascot Ord.	101—106	...
128,182	Dec. 19	5	5	Do. 5 p.c. Pref.	107—112	...
31,035	Aug. 22	–/4⅛	–/4⅛	Associated Utilities 4 p.c. Pref.	16/—18/–	...
100,000	Dec. 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
17,000	Feb. 20	8	8	Bognor Orig. Ord. 'A' ...	152—162*	—3
62,210	,,	8	8	Do. New Addl. 'A' ...	152—162*	—3
87,160	,,	7	7	Do. New 7 p.c. max. ...	142—152*	—3
37,440	Feb. 6	10	10	Cam. Univ. & Town 10 p.c. max.	183—193	...
125,970	,,	7	7	Do. 7 p.c. max.	131—136	...
39,025	,,	5	5	Do. 5 p.c. max.	95—100	...
96,410	Feb. 6	4½	4½	Cardiff 4½ p.c. Pref.	93—98	...
150,000	Feb. 20	4	4	Croydon 4 p.c. Pref.	91—96*	—2
130,000	Dec. 19	4	4	Do. 4 p.c. Deb.	93—98	—2
65,000	Feb. 20	8½	7½	Eastbourne 'A' 5 p.c. ...	140—145	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	113—118	...
112,312	,,	5	5	Do. 5 p.c. Pref.	107—112	...
130,000	Dec. 19	5	5	Do. 5 p.c. Deb.	110—115	...
24,000	Feb. 20	8½	8½	Great Yarmouth 8½ p.c. max.	40—45*	—3
59,400	,,	7½	7½	Do. 7½ p.c. max.	30—35*	—3
51,160	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	117—122	...
152,600	Feb. 20	8	9	Guildford Cons.	160—165*	—3
54,055	,,	5	5	Do. 5 p.c. Pref.	103—108*	—2
68,250	Dec. 19	5	5	Do. 5 p.c. Deb.	108—113	...
156,600	Feb. 20	7½	7½	Hampton Court Cons. ...	123—128*	—3
80,000	Aug. 8	4	4	Lea Bridge 4 p.c. Pref. ...	90—95	...
60,000	,,	6	6	Do. 6 p.c. Pref.	121—126	...
94,876	Dec. 5	4	4	Do. 4 p.c. Deb.	92—97	—2
73,620	Sept. 5	8½	8½	Luton Cons. 'A'	153—163	...
107,960	Sept. 19	5½	4	Mid Kent Ord.	8½—9½	...
230,940	Feb. 6	10	10	Oxford & District Ord. ...	192—197	...
47,112	,,	5	5	Do. 5 p.c. Pref.	104—109	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	108—113	...
126,193	Nov. 7	7½	7½	Peterborough Ord.	137—142	...
64,990	Sept. 5	6½	7½	Redditch Ord....	118—128	...
166,850	Feb. 6	8	8	Romford Ord....	142—147	...
60,000	,,	4	4	Do. 4 p.c. Pref.	97—102	...
44,000	Sept. 19	5	5	Do. 5 p.c. Deb.	110—115	...
25,570	Feb. 6	5½	5½	Rugby 5½ p.c. Pref.	118—123	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	103—108	...
42,750	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	117—122	...
110,950	Feb. 20	8	8	Ryde Ord.	137—147*	—3
270,086	Sept. 5	7	7	Slough Ord.	128—133	...
21,000	Dec. 19	5	5	Do. 5 p.c. Deb.	107—112	...
28,872	Nov. 7	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	17/—19/–	...
28,866	Sept. 5	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/–	...
117,228	Feb. 20	5	7	Swindon Cons.	100—105*	—2
60,425	Dec. 5	5	5	Do. 5 p.c. Deb.	108—113	—2
64,380	Dec. 19	5	5	Torquay & Paignton 5 p.c. Pref.	105—110	...
130,000	Feb. 6	5	8	Wakefield Ord.	116—121	...
81,650	,,	5	5	Do. 5 p.c. max.	92—97	...
82,000	Jan. 23	6	6	Weymouth Ord.	101—106	...
98,384	Feb. 6	6	6	Wolverhampton 6 p.c. Pref.	117—122	...
160,000	Dec. 19	5½	5½	Do. 5½ p.c. Rd. Db.	103—108	...
90,000	Dec. 19	5	5	York 5 p.c. Red. Deb. ...	102—107	—1
133,640	Feb. 20	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	115—120*	—3
120,000	,,	5	5	Do. 5 p.c. Pref.	103—108*	—2
35,000	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	115—120	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
347,756	Feb. 6	5	6	Bath Cons.	115—117	...
1,667,250	Feb. 6	5	5	Bristol, 5 p.c. max.	109½—111½	...
120,420	Dec. 19	4	4	Do. 1st 4 p.c. Deb. ...	98—101	...
217,870	,,	4	4	Do. 2nd 4 p.c. Deb. ...	98—101	...
328,790	,,	5	5	Do. 5 p.c. Deb.	117—120	...
274,000	Feb. 20	5	5	Newport (Mon.) 5 p.c. max. ...	95—98*	—1½
13,200	Sept. 19	8½	7	Pontyp'l Gas & W. 10 p.c. 'A'	12⅝—13⅛	...
13,600	,,	6	5	Do. 7 p.c. 'B' ...	11¼—12⅛	...
40,000	,,	6	5	Do. 7 p.c. 'C' ...	11¼—12⅛	...
140,778	Feb. 6	5	5	Weston-super-Mare Cons. ...	104—106	...
64,338	Dec. 19	4	4	Do. 4 p.c. Deb. ...	98—101	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb. ...	149—152	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
157,150	Feb. 6	5	6½	Chester 5 p.c. Ord.	107—110	...
92,500	Dec. 19	4	4	Do. 4 p.c. Pref.	95—99	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	87—90	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101	...
2,167,410	Feb. 20	6	6	Liverpool 5 p.c. Ord.... ...	120—122*	—2
245,500	Dec. 19	5	5	Do. 5 p.c. Red. Pref. ...	100—105	...
306,083	Jan. 23	4	4	Do. 4 p.c. Deb.... ...	100—102	...
106,280	Feb. 6	10	10	Preston 'A' 10 p.c.	177—187	...
188,219	,,	7	7	Do. 'B' 7 p.c.	129—139	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
122,577	Feb. 20	8	8	Blyth 5 p.c. Ord.	160—162	...
732,000	Feb. 20	3	3	Hartlepool G. & W. Cn. & New	69—71	...
2,061,315	Feb. 6	5	5⅛	Newcastle & Gateshead Con.	22/6–23/–a*	...
682,856	,,	4	4	Do. 4 p.c. Pref. ...	98½—99⅛*	...
776,706	Dec. 19	3½	3½	Do. 3½ p.c. Deb. ...	88—89	...
277,285	Oct. 24	5	5	Do. 5 p.c. Deb. '43 ...	103½—105½	...
332,351	Feb. 6	6	6	Sunderland 6 p.c. max. ...	132½—134½*	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
542,270	Feb. 6	6	9	Derby Con.	132—137	...
55,000	Dec. 19	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	Dec. 19	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 24.	Rise or Fall on Week.
10,000	Feb. 6	10	10	Great Grimsby 'A' Ord. ...	205—215*	...
6,500	,,	10	10	Do. 'B' Ord. ...	205—215*	...
79,000	,,	10	10	Do. 'C' Ord. ...	195—205*	...
1,806,339	Feb. 20	6½	6½	Sheffield Cons.	135½—137½*	—3½
95,000	Dec. 19	4	4	Do. 4 p.c. Deb.	100—102	...

a The quotation is per £1 of Stock.

PUBLISHERS' NOTICE

TERMS OF SUBSCRIPTION

United Kingdom & Ireland : Advance Rate, 35/- per annum ; 18/- per half year. Credit Rate : 40/- per annum ; 21/- per half year.
Dominions & Colonies & United States : 35/- per annum, in advance. Other countries in the Postal Union, 40/- per annum, in advance.

A copy of the "G.J." Calendar and Directory is presented to continuous subscribers.

CLASSIFIED ADVERTISEMENTS

Situations Wanted, 6d. a line (minimum 3/-, about 36 words). Situations Vacant, Plant for Sale and Wanted, Contracts, Public Notices, Educational, &c., 9d. a line (minimum 4/6). Financial Notices, 1/- per line. Box Number, 6d. extra.

WALTER KING, LTD.,

Telephone : Central 2236-7-8. 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4. Telegrams : Gasking, Fleet, London.